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Linear Array Vision System for Factory Automation, Inspection and Control. System includes Light Sources, Linear Array Cameras and Programmable Sensor Controller. 2-Dimensional Gray-Scale Systems also available.

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DORIC

Doric Minitrend™ 205 Data Logger

Compact, low-cost, digital display recorder for temperature and other process measurements.

- Rugged construction for real-world environments.
- Compact—just 10.5″ x 5.8″ x 16″; weighs only 18 lbs.
- Nine programmable alarm limits.
- Twelve-point, field installable input cards—up to 36 points/recorder.
- Switch-selectable ranges for thermocouples, engineering units, spannable current and voltage inputs, RTD's.
- Optional plug-in serial and alarm relay I/Os.
- Two-year warranty

Delivery From Stock
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Here's maximum data logger performance and applications flexibility in a reliable, compact, low-cost package.

The Doric Minitrend 205 is a versatile, sensibly priced alternative to strip chart and multipoint recorders. This compact and reliable unit can be used as a simple multipoint indicator, as well as a logger to record data conveniently and accurately. A bench-top version is standard, and low-cost options are available for panel mount, rack mount, and tilt stand versions.

A perfect match with your needs.
The advanced 205 is far easier to use than strip chart recorders. Doric's crisp digital display provides exact data without time-consuming and error-producing operator interpretation.

Also, Doric's newest data acquisition system invites comparison with full-size data loggers and multipoint recorders.

"Competitive" multipoint recorders simply don't offer the flexibility in alarm and range changes. They lack digital communications and math packages. They also act slower and have many moving parts that create reliability problems.

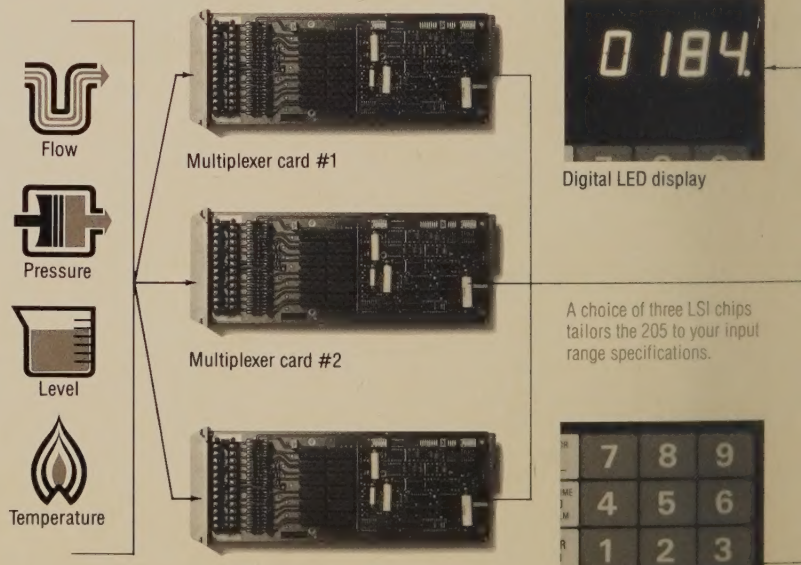
On the other hand, many full-size data loggers can have costly features you simply don't need. In addition, these larger units can use up valuable panel space and many are hard to operate, with complex and bewildering controls.

Doric delivers benefits where other machines provide drawbacks.
The compact, easy-to-use 205 is a flexible and extremely cost-effective machine. Modular design lets you buy exactly what you need—and expand the system any time to accept up to 36 input points or to incorporate new I/O capabilities.

A choice of field-installable multiplexer cards is available to accept inputs from thermocouples, linear DC millivolts, RTD's, or current or voltage process transmitters. The 205 converts them all into digital output in engineering

Optional carrying handle

Functional Overview—Minitrend™ 205 Data Logger



Each of these field-installable cards accepts up to 12 inputs from thermocouples, millivolts, volts or current transmitters, or 8 inputs from RTD sensors. A system can have 1, 2 or 3 cards.

units on the built-in LED display and alphanumeric thermal printer.

Options may be specified at time of initial order or field-installed at any time. They include serial I/O for two-way digital communications and remote start contact closure input, alarm relay I/O, alarm relay panel, plus a variety of accessories.

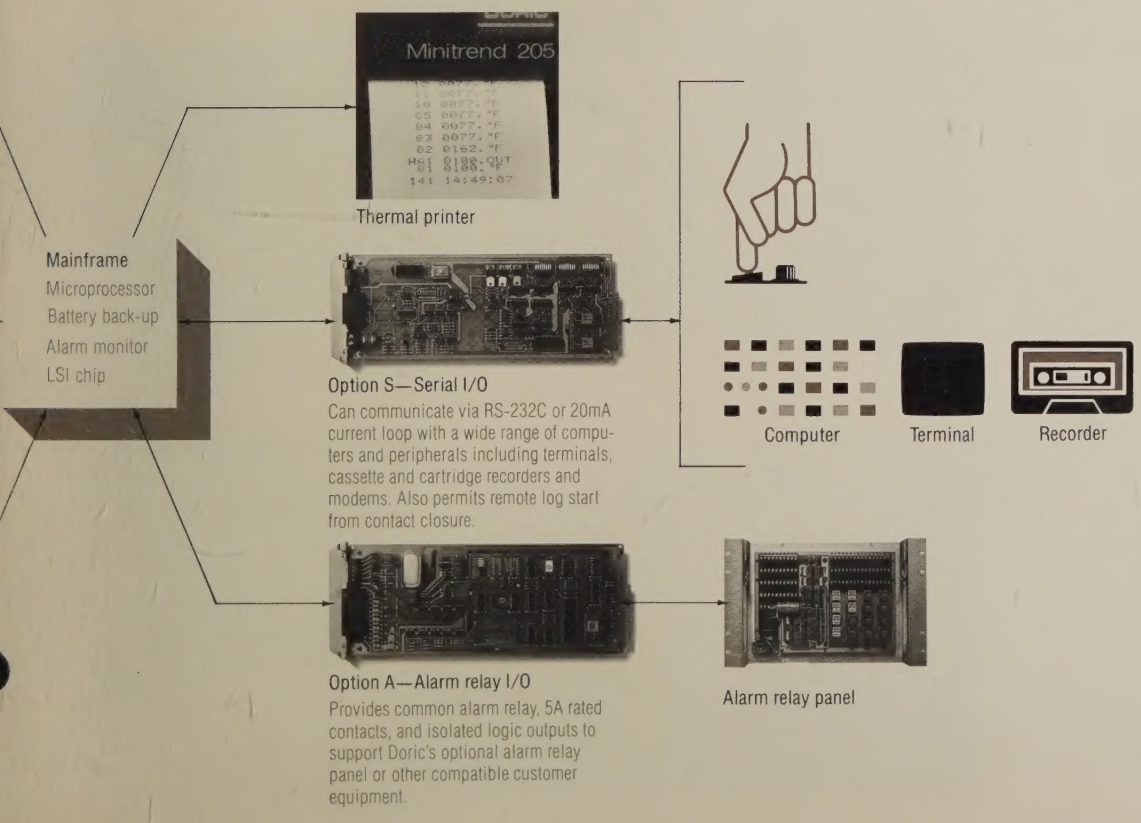
System basics.

Accuracy is rated at better than 0.15% of reading. Normal encoding rate is approximately one point per second. In this high-performance Doric system, print rate, display function, alarm scan and serial I/O are independent of encoding rate. As a result, you can use any of these functions, while data acquisition continues non-stop.

Small, yet rugged package handles harsh industrial environments.

All of these capabilities—and more—come in a compact, 18-pound package. A fraction the size of comparable data loggers, Minitrend 205 conserves panel space. It's also fully portable, putting plenty of power into a small package that opens up new field testing and monitoring possibilities.

Harsh field and industrial environments pose no problems, thanks to a tough metal case and sealed touch panels, plus hermetically sealed, heavy-duty reed relay switching. Electronics reliability is assured by conservative design, superior component selection, extensive burn-in, and exhaustive testing. In fact, RFI/EMI tests performed by an independent laboratory showed that the 205 meets or exceeds Mil-Spec levels. Copies of these test results are yours for the asking.


Minitrend 205
Thermal printer
Mainframe
Microprocessor
Battery back-up
Alarm monitor
LSI chip
Computer
Terminal
Recorder
Option S—Serial I/O
Can communicate via RS-232C or 20mA current loop with a wide range of computers and peripherals including terminals, cassette and cartridge recorders and modems. Also permits remote log start from contact closure.
Option A—Alarm relay I/O
Provides common alarm relay, 5A rated contacts, and isolated logic outputs to support Doric's optional alarm relay panel or other compatible customer equipment.
Alarm relay panel

Minitrend 205—An easy-to-install, easy-to-use system that delivers all the facts you need.

All the advantages of the 205 are simple to incorporate into your process or product. All inputs are made at the rear of the instrument, via removable cards with screw terminals. Just use a screwdriver for fast, reliable connection of leads to the 205's barrier strip.

Multiplexer (MUX) cards bring your inputs into the 205. A system can have one to three cards, each accommodating up to 12 inputs of the same type. The MUX teams with an LSI chip inside the mainframe to provide basic range specifications. A choice of three chips is available, as outlined below and detailed in the input range specifications on page 11.

For further applications flexibility, each MUX has on-board dip switches. These permit field selection of a variety of input functions including range, engineering units, decimal point position, and thermocouple break detection. Switches are easily reset at any time to meet new and changing needs.

Built tough—for tough environments.

Construction of the 205 takes full advantage of everything Doric's learned in manufacturing and installing more than 60,000 instruments.

The MUX and option cards plug into a heavy-duty chassis which features all-metal construction as a safeguard against RFI and other environmental hazards.

Besides making it strong, we've made the 205 sensibly simple. A system with every option and full 36-point capabilities has just nine cards.

Battery back-up.

Power failure is another common environmental problem. However, the 205 makes it far less troublesome. If the power goes out, battery back-up saves alarm limits, limit assignments and recording commands. In addition, the internal crystal clock will continue to run for up to 30 days, automatically restoring the front panel time display to the correct time at power up.

Easy operator interface.

The front panel contains all the controls, indicators and display needed to operate the 205.

Range Table

Input Type		Range
J thermocouple	(iron/constantan)	−200 to +933°C (−328 to +1712°F)
K thermocouple	(chromel/alumel)	−133 to +1400°C (−208 to +2552°F)
T thermocouple	(copper/constantan)	−200 to +399°C (−328 to +751°F)
E thermocouple	(chromel/constantan)	−199 to +1066°C (−327 to +1951°F)
R thermocouple	(platinum/13% rhodium)	0 to +1788°C (+32 to +3251°F)
S thermocouple	(platinum/10% rhodium)	0 to +1788°C (+32 to +3251°F)
B thermocouple	(platinum/30% rhodium)	+489 to +1866°C (+912 to +3392°F)
J DIN thermocouple	(iron/constantan)	−199 to +899°C (−327 to +1651°F)
T DIN thermocouple	(copper/constantan)	−199 to +599°C (−327 to +1111°F)
Current transmitters	4-20mA, 10-50mA	0 to 100.0%, user variable scaling
Linear voltage		−10 to +25mV; −100 to +250mV;
Linear voltage		−1 to +2.5V; −10 to +25V; −50 to +100V
Linear voltage		0 to +5V user variable scaling
PRTD, 100Ω	(α = .00385 or α = .00392)	−233.3 to +887.8°C (−387.9° to +599.9°F)
PRTD, 100Ω	(α = .00385 or α = .00392)	−387°F to +1632°F
Thermistor	(YSI 700 series)	−60 to +200°C (−75 to +400°F)
RTD, 10Ω	(copper)	−30.0 to +100.0°C (−22.0 to +212.0°F)

Up to three multiplexer cards, each capable of handling up to 12 sensor inputs, are mounted in the 205 chassis.

The full-function, color-coded touchpad is used to request and enter data, to set alarm limits, to skip unused points, to specify recording intervals, and to select method of data output. For security, the touchpad can be locked out by an internal switch that prevents unauthorized changes. And for flexibility, the optional serial I/O permits remote operation.

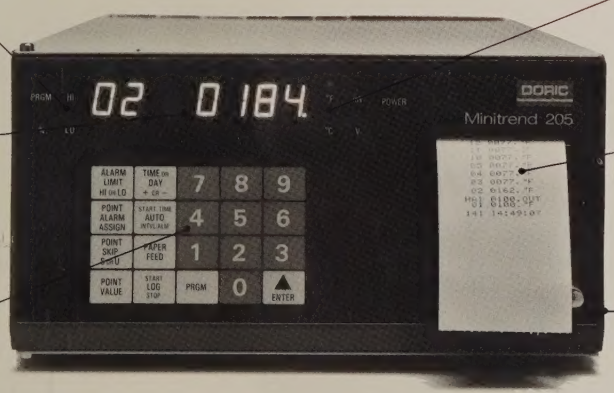
With just ten numeric and ten function keys, the system is simple to learn. For instance, if the operator wants to check point #13, only three keystrokes are required—"POINT VALUE" "1" "3." The point value is displayed on the front panel LEDs in engineering units so there's no need for operator interpretation.

Any key can be used at any time without interrupting the independently set scan, printout, or data outputting functions. As a result, the 205 delivers the simplicity of a multipoint indicator, plus the capabilities of continuous data monitoring.

Output the way you want it.

The 205 provides information in its most useful form. The operator can take an instant and direct reading from the crisp 0.5" digital display, or select the built-in printer to record information for subsequent review.

As detailed on the following pages, the printer provides complete information on alarm status. The 205 offers nine individually specified alarm limits, which can be any combination of high or low alarms. Because any alarm limit can serve a group of points being monitored, all 36 points in the system can be covered by high and low alarms.



Alarm status indicators flash to display "HI" or "LO" alarm status.

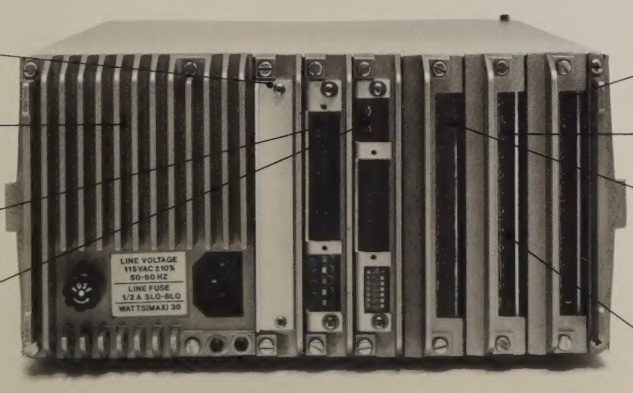
Digital display uses bright 0.5 LEDs to indicate process data, alarm values, alarm assignments, recording times, time of day, and day of year.

Full-function touchpad provides complete operator interface.

Indicator lights show whether display is reading in °C, °F, millivolts, volts, or percentages. "PRGM" shows mode of operation.

Quiet thermal printer delivers easily read records of such data as point ID, process variable, alarm status, time of day, and day of year.

Rugged, heavy-gauge metal case protects against RFI, dust, and temperature extremes.



CPU card

Power supply module

Alarm relay I/O option card

Serial I/O option card

Multiplexer card #1 (points 25-36)

Multiplexer card #2 (points 13-24)

Multiplexer card #3 (points 1-12)

Barrier strips for input connections

Minitrend 205 at work.

6

The 205 provides a wide range of information, ranging from simple display of time and day to detailed records of all points in the system. The operator can display data on the front panel or cause it to be printed out. If the operator requests information while the 205 is recording a log, both functions are handled simultaneously and without interruption.

Here are some specifics on how the Minitrend 205 delivers the facts you need...

Manual or autoscan point monitoring permits selection of manual or automatic monitoring of specific points in the system. Just press "POINT VALUE" to see what is taking place at any specified point in the system. The "▲" key is used to jog to points in the system when the system is in the point monitor mode. This jogging can be manual (press key to view one point at a time) or automatic (press and hold a few seconds so the 205 will begin to scan through and display all points automatically).

Point monitor mode function shows that point #24 is at 167°F.

The "POINT SKIP" key permits bypassing specified points during the scanning sequence. In this mode, the display shows a "U" or "S" to indicate whether the point is unskipped or skipped.

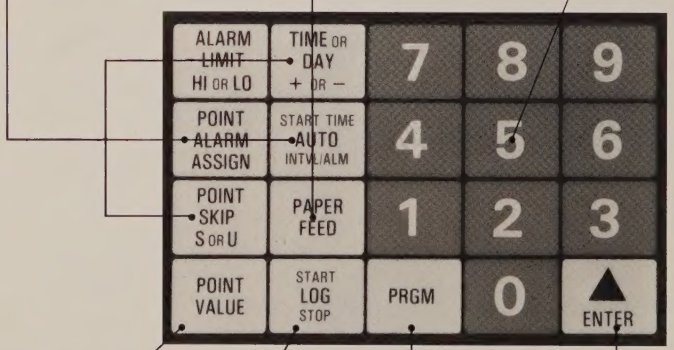
This display of point skip mode shows that point #24 is unskipped.

Color-coded touchpad is easy to learn and use.

Command keys enter and display alarm limits, points not active, time of day, day of year, and start/interval scan time for recording.

"Paper feed" advances paper in printer and also serves for display test.

Numeric keys (0-9) provide easy entry of data.

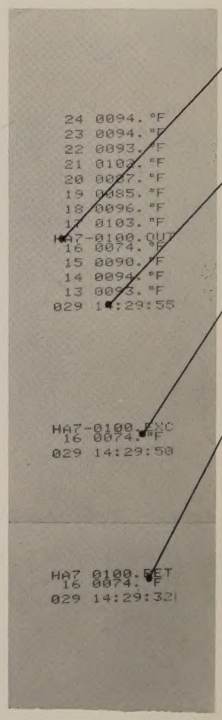


"Point value" calls up and displays the value of any point in the system without disturbing data collection and recording.

"Log" manually starts a recording of all unskipped points, or aborts a recording in process.

"PRGM" activates command select keys.

"Enter" is used to jog through points and enter commands.



High alarm (A7) was set at −100°. "OUT" indicates that the point is in alarm.

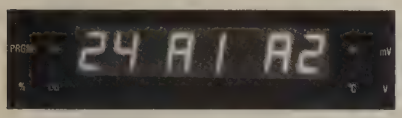
Time (hours/minutes/seconds on a 24-hour clock). Day of the year.

"EXC" indicates that the point, at this moment, exceeded the alarm limit value of −100°.

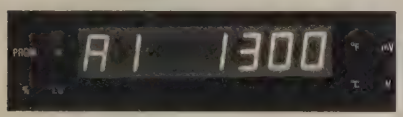
"RET" indicates that point 16, now at 74°, has returned to an acceptable reading below the high alarm (A7) set at 100°.

The built-in thermal printer provides clear, reliable hard copy information. There is no mechanical printhead to fail, no messy ink to smear or spill. The quiet, 12-column alphanumeric printer details time, day, point identification, alarm status, and input data at preselected intervals.

Independent alarm scanning monitors critical points for out-of-limit conditions. The "ALARM LIMIT" key displays the alarm limit number (A1 through A9) and its specified value. "POINT ALARM ASSIGN" key shows which alarms have been assigned to a specific point.



Display for alarm assign mode shows that alarm limits #1 and #2 are assigned to point #24



Value set for alarm A1 is 1300 and it has been set as a high limit

Value set for alarm A2 is 1100 and it has been set as a low limit

24-hour clock and calendar are displayed by pressing "TIME" or "DAY" key. The day calendar may also be used as a day counter to 999 days.

Day mode display shows January 29th as day number 029. If desired, this could also be used to signify the 29th day of an extended data collection period

Time mode display reads as hours/minutes/seconds on a 24-hour clock. Example shows 2:05:48 p.m.

Programmable auto log start time and interval alarm logging provide three functions via the "START TIME AUTO INTVL/ALM" key. In the start time mode, the system informs when the next auto log of all unskipped points will be initiated. The start time is automatically updated (adds interval to previous start time) after each auto log is initiated.

In start time mode, the display indicates the next auto log of unskipped points will take place at 3:40 p.m

In the interval mode, the display shows time between logs.

All unskipped points will be logged in 15-minute intervals

The third function permits turning on the alarm log mode, where alarm transitions (points passing in and/or out of alarm) can be logged. This function operates independently of the interval mode.

In alarm log mode, display shows that alarm transition logging is enabled

Display test is accomplished by pressing the "PAPER FEED" key. This function checks all LED displays and front panel indicators, while simultaneously advancing paper in the printer.

Manual log control is used to manually start or stop a log sequence, merely by pressing the "LOG" key.

Display/log messages are automatically provided by the 205 if a point value cannot be displayed or logged. In this case, a coded message shows the reason, as detailed in the table below:

Operator Information Displays

Display	Log	Status
NO SCAN	ALL SKIPPED	All points programmed skipped.
PASS	(no log)	Displayed point is skipped.
INPUT	(no log)	No MUX for displayed data point.
INPUT	NO INPUT	No MUXes installed at all.
PAUSE	PAUSE	Point temporarily has no reading.
FAIL	AD FAIL	A/D (analog/digital) failure.
RANGE	RANGE	Point over-ranged or open input.

Digital communications and alarm relay options.

8

Minitrend 205 accepts two plug-in option cards—serial I/O and alarm relay I/O. These are available with initial order or can be field-installed at any time. When the alarm relay I/O is specified, the system can also use the optional alarm relay panel.

Serial I/O (Option S)

Serial I/O permits two-way digital communications via RS-232C or 20 mA current loop interface.

Throughput is up to 20 points/second. In addition, a remote start line provides the ability to initiate a remote log of all unskipped points from an external contact closure.

With two-way communications, the 205 can be operated and programmed from a remote station, while the unit itself stays at the process so personnel there can continue to obtain point indication and printouts. (Points may be recorded from the serial I/O at intervals different from and in addition to those specified from the 205's front panel!)

Switch-selectable settings include choice of transmission rates up to 9600 baud, RS-232C or current loop, timing nulls, parity, start/stop bits, ACK/NAK, block header/trailer, and additional communications formatting features.

Alarm Relay I/O (Option A)

This plug-in card provides a master relay and I/O interface to Doric's unique alarm relay panel, option ARP1

The master relay is a form C, common to all alarm limits. Operation is fail-safe.

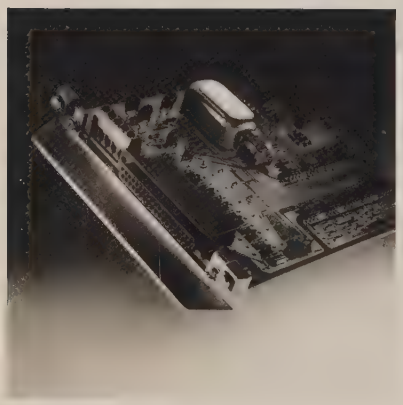
The interface to the ARP1 includes inputs for reset and operator acknowledgements. Without the optional ARP1, output consists of ten logic levels.

A switch on the card permits selection of three different modes of relay operation:

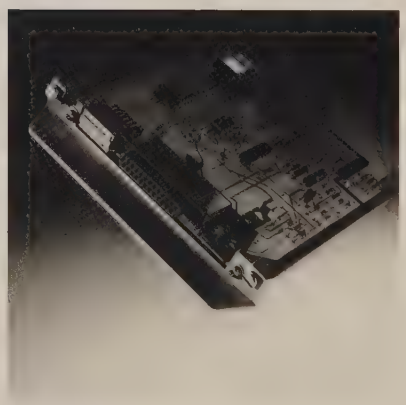
1. Auto reset—Alarm operation is totally controlled by the 205.

2. Manual reset—Relay resetting requires an operator contact closure input.

3. ISA Sequence A.—Relay "flashes" until acknowledged, then goes to auto reset.



Alarm Relay I/O



Serial I/O

205A-ARP1

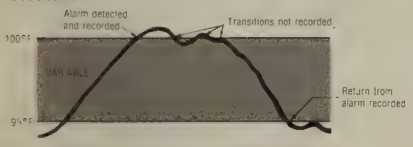
Additional alarm relay capabilities.

The alarm relay card also provides extended alarm monitoring capabilities, including a deadband calculation, group average alarm limit, and a tracking alarm limit. Selection of functions is mutually exclusive, but can be changed at any time.

Deadband is used in such applications as heating and cooling, where alarm relays are used to control electric heaters or cooling pumps. Here, it is desirable to prevent the relay from "chattering" as the measured variable hovers around the alarm limit, going in and out of limit.

To prevent this condition, which could burn up relays or process equipment, the alarm relay card lets the operator enter a deadband (gap) between alarm transitions as follows:

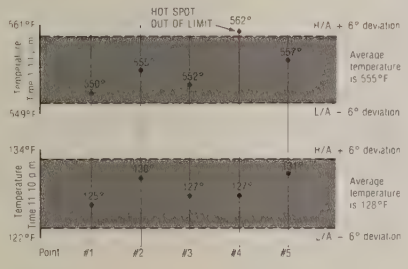
Deadband



Alarm #1 is set at a high limit of 100°F. Deviation is set to −5°F, creating the deadband from 95° to 100°F.

Group average deviation alarm is extremely useful in heating applications that are critical to "hot spots." All input points sharing a common alarm limit number are averaged at the end of each scan. The computed average is used as the magnitude of the alarm limit when a deviation value, entered by the operator, is added to high limits or subtracted from low limits to determine the final value of the alarm limit. Any input point sharing the alarm limit will cause an alarm if it exceeds the combined value of group average and deviation.

Group average deviation alarm

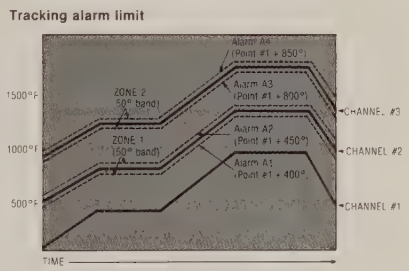


An alarm condition is noted at 1:10 p.m., when the average of points #1 through #5 is 555° and the deviation entered makes the value of the high alarm 561°. Point #4 exceeds this alarm limit and is recorded as a hot spot.

Tracking alarm limit is useful in monitoring zone furnaces, where the desired temperature in successive zones depends on the actual temperature of the first zone. In this mode, tolerances are set and temperatures of the various zones compared.

The actual temperature of point #1 is tracked by alarm limits which have a deviation, set by the operator. This deviation is the desired or allowed difference between point #1 and the point to which the alarm limit is assigned. In the following example, four alarm limits have been used to establish 50° bands around zones 2 and 3 of the furnace:

Tracking alarm limit



This three-zone furnace has a deviation band of 425°F ±25° set for point #2 and +825°F ±25°F for point #3. The input to point #1 could also be provided by a millivolt source to simulate an input temperature or variable, providing a means of setting alarm limits remotely via an analog signal.

Alarm Relay Panel (Option ARP1)

ARP1 may be added at any time. Field wiring for relay outputs and user reset and acknowledge inputs is terminated on barrier strip screw terminals capable of accepting up to 14 AWG wire.

Relays on the ARP1 include a master which works in parallel to the relay on the Option A board, plus nine relays assigned to individual alarm limits. The resetting mode of these relays is determined by switch selection on the Option A, as previously described.

Range Selection Table/Input Range Specifications

10

Table A. LSI 7500

Function Designator	12. Pt. MUX Designator	Range Designator	Type of Input	Range	Resolution	30 day Overall System Accuracy**
A	1	0JF	Iron/Constantan	−328 to +1712°F	1°	±1°
A	1	0JC	Iron/Constantan	−200 to +933°C	1°	±1°
A	1	0KF	Chromel/Alumel	−208 to +2551°F	1°	±1.5°<0°<1°
A	1	0KC	Chromel/Alumel	−133 to +1399°C	1°	±1°
A	1	0TF	Copper/Constantan	−328 to +751°F	1°	±1°
A	1	0TC	Copper/Constantan	−200 to +399°C	1°	±1°
A	1	0RF	Pt-13%-Rhodium	+32 to +3251°F	1°	±3°<350°<2°
A	1	0RC	Pt-13%-Rhodium	0 to +1788°C	1°	±2°
A	1	0SF	Pt-10%-Rhodium	+32 to +3251°F	1°	±3°<600°<2°
A	1	0SC	Pt-10%-Rhodium	0 to +1788°C	1°	±2°
A	1	0BF	Pt-30%-Rhodium	+912 to +3392°F	1°	±4°
A	1	0BC	Pt-30%-Rhodium	+489 to +1866°C	1°	±3°

Table B. LSI 7501

B	2	0KF	Chromel/Alumel	−208 to +2551°F	1°	±1.5°<0°<1°
B	2	0KC	Chromel/Alumel	−133 to +1399°C	1°	±1°
B	2	0EF	Chromel/Constantan	−327 to +1951°F	1°	±1°
B	2	0EC	Chromel/Constantan	−199 to +1066°C	1°	±1°
B	2	FCF	(DIN) Iron/Constantan	−327 to +1651°F	1°	±1°
B	2	FCC	(DIN) Iron/Constantan	−199 to +899°C	1°	±1°
B	2	CCF	(DIN) Copper/Constantan	−327 to +1111°F	1°	±1°
B	2	CCC	(DIN) Copper/Constantan	−199 to +599°C	1°	±1°
B	2	K1L	Linear Voltage	−10 to 25mV	10μV	±2 counts
B	2	K2L	Linear Voltage	−100 to 250mV	100μV	±1 count
B	2	K3L	Linear Voltage	−1 to 2.5V	1mV	±1 count
B	2	K4L	Linear Voltage	−10 to 25V	10mV	±1 count
B	2	K6L	Linear Voltage	−50 to 100V	100mV	±2 counts
B	3	PT1	Platinum RTD, $\alpha = .00385$, $R_o = 100\Omega$	−387.9 to 599.9°F	0.1°†	±.4
B	3	PT2	Platinum RTD, $\alpha = .00392$, $R_o = 100\Omega$	−387.9 to 599.9°F	0.1°	±.4
B	3	PT3	Platinum RTD, $\alpha = .00385$, $R_o = 100\Omega$	−387 to 1632°F	1°	±1
B	3	PT4	Platinum RTD, $\alpha = .00392$, $R_o = 100\Omega$	−387 to 1632°F	1°	±1
B	3	PT5	Platinum RTD, $\alpha = .00385$, $R_o = 100\Omega$	−233.3 to 887.8°C	0.1°	±.2
B	3	PT6	Platinum RTD, $\alpha = .00392$, $R_o = 100\Omega$	−233.3 to 887.8°C	0.1°	±.2
B	3	CUF	Copper RTD, 10Ω	−75 to 400°F	1°	±3
B	3	CUC	Copper RTD, 10Ω	−60 to 200°C	1°	±2
B	3	THF	Thermistor, YSI-700	−22.0 to 212.0°F	0.1°	±.4
B	3	THC	Thermistor, YSI-700	−30.0 to 100.0°C	0.1°	±.2
B	4	I1L	4-20 mA Current	Factory Set 0-100.0%	Variable Scaling*	±1 count
B	4	I2L	10-50 mA Current	Factory Set 0-100.0%	Variable Scaling*	±1 count
B	5	K5L	Linear Voltage 0-200V	Factory Set 0-100.0%	Variable Scaling*	±2 counts

**Accuracy specifications are based on a mean value of ten readings at 23° ±3°C (73° ±5°F) and include worst case errors for conformity, linearity, resolution and ±10% line voltage variation.
†0.1° resolution available only in units shipped after August 1, 1982.

*Variable Scaling Zero: −1000 to 2000
Span: 100 to 2500
Engineering Units: selectable

Table C. LSI 7502

Function Designator	MUX Designator	Range Designator	Type of Input	Range	Resolution	30 day Overall System Accuracy**
C	2	0KF	Chromel/Alumel	−208 to +2551°F	1°	±1.5°<0°<1°
C	2	0KC	Chromel/Alumel	−133 to +1399°C	1°	±1°
C	2	0EF	Chromel/Constantan	−327 to +1951°F	1°	±1°
C	2	0EC	Chromel/Constantan	−199 to +1066°C	1°	±1°
C	2	0JF	Iron/Constantan	−328 to +1712°F	1°	±1°
C	2	0JC	Iron/Constantan	−200 to +933°C	1°	±1°
C	2	0TF	Copper/Constantan	−328 to +751°F	1°	±1°
C	2	0TC	Copper/Constantan	−200 to +399°C	1°	±1°
C	2	K1L	Linear Voltage	−10 to 25mV	10μV	±2 counts
C	2	K2L	Linear Voltage	−100 to 250mV	100μV	±1 count
C	2	K3L	Linear Voltage	−1 to 2.5V	1mV	±1 count
C	2	K4L	Linear Voltage	−10 to 25V	10mV	±1 count
C	2	K6L	Linear Voltage	−50 to 100V	100mV	±2 counts
C	3	PT1	Platinum RTD, $\alpha = .00385$, $R_o = 100\Omega$	−387.9 to 599.9°F	0.1°†	±.4
C	3	PT2	Platinum RTD, $\alpha = .00392$, $R_o = 100\Omega$	−387.9 to 599.9°F	0.1°	±.4
C	3	PT3	Platinum RTD, $\alpha = .00385$, $R_o = 100\Omega$	−387 to 1632°F	1°	±1
C	3	PT4	Platinum RTD, $\alpha = .00392$, $R_o = 100\Omega$	−387 to 1632°F	1°	±1
C	3	PT5	Platinum RTD, $\alpha = .00385$, $R_o = 100\Omega$	−233.3 to 887.8°C	0.1°	±.2
C	3	PT6	Platinum RTD, $\alpha = .00392$, $R_o = 100\Omega$	−233.3 to 887.8°C	0.1°	±.2
C	3	CUF	Copper RTD, 10Ω	−75 to 400°F	1°	±3
C	3	CUC	Copper RTD, 10Ω	−60 to 200°C	1°	±2
C	3	THF	Thermistor, YSI-700	−22.0 to 212.0°F	0.1°	±.4
C	3	THC	Thermistor, YSI-700	−30.0 to 100.0°C	0.1°	±.2
C	4	I1L	4-20 mA Current	Factory Set 0-100.0%	Variable Scaling*	±1 count
C	4	I2L	10-50 mA Current	Factory Set 0-100.0%	Variable Scaling*	±1 count
C	5	K5L	Linear Voltage 0-200V	Factory Set 0-100.0%	Variable Scaling*	±2 counts

Minitrend 205 Specifications

Input Specifications

Measurement technique: Dual-slope integrating, auto-zeroing, true differential input, analog-to-digital conversion

Multiplexing method: 12 point cards, reed switching (8 point RTD MUX's)

Measurement speed: One point per second typical

Analog input function types: Thermocouple, volts, millivolts, RTD's, milliamps 36 standard functions. One range per 12-point MUX card

Resolution: Four digit, 1°/10μV; 0.1° RTD's

Thermocouple linearization error: Less than 0.2°F for most ranges

Linearization: 100% digital using 42 to 46 segments, depending upon range

Long term stability: Zero ≤30μVolts for 1 year
Span ≤.2% rdg for 1 year

Input impedance: To >100 megohms, dependent on MUX type/function

Stability with temperature: Zero: 1 μVolt/°C
Span: 0.01% rdg/°C

Reference junction error: ±0.028°/° (0° to 50°C) (Type J)

RTD excitation current: 0.5 mA; individual sensor gain adjustments.

Common mode: ≥140db (DC)
≥130db (50/60 Hz, ±0.1%)

Normal mode: ≥70db (50/60 Hz, ±0.1%)

Common mode voltage: Input to chassis ground: 500 VDC or AC (peak), to [illegible] 200 VDC or AC (peak)
Point to point on RTD MUX: 50 VDC or AC (peak)

Output Specifications

Display: 7 segment, 0.5" LED

Indicators: Individual red LED indicators for °F, °C, V, mV, % and Hi or Lo alarm

Printer: Thermal, alphanumeric, 12 columns, 5 x 7 dot matrix, 2.0 lines per second minimum, 8 lines per inch (3.1 lines/cm), 260 ft. fanfold thermal paper optional 80 ft. roll thermal paper adapter

RS232C or 20mA current loop I/O: Switch selectable baud rate: 110, 300, 1200, 1800, 2400, 4800,* 9600* baud
RS232C voltage levels or 20mA current loop (active or passive transmit and receive), field configurable. ASCII code

Fully user programmable character format and protocol (bits/character, parity, stop bits, delay, full or half duplex, line and block control, header and trailer data, etc.)
Remote log start contact closure input
*240 characters per second, average throughput rate

Alarm Monitoring

Alarm limits (standard): Nine user programmable alarm limits, maximum of two alarm limits per point

Alarm logging: Alarm conditions may be logged on demand or on transition in and out of alarm

Alarm relay I/O (option A): One alarm relay, Form C, 115 VAC or 28 VDC 5 amp max, non-inductive load. Includes output interface to optional alarm relay panel (option ARP1), 8 foot cable

Alarm relay panel (option ARP1): 10 relays, Form C, 115 VAC or 28 VDC, 2 amp max., non-inductive load (requires option A)
[illegible]

Physical Specifications

Physical Specifications

Dimensions:

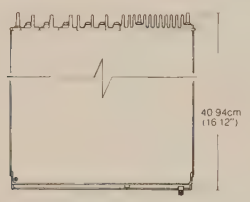
Mainframe:	10.5″W x 5.5″H x 16.1″D (26.7cm x 14.0cm x 40.9cm)
Panel cutout:	12.3″W x 7.35″H (31.2cm x 18.7cm)
Panel bezel outside dim.:	12.9″W x 8.4″H (32.8cm x 21.3cm)
Rackmount:	19.0″W x 6.97″H (48.3cm x 17.7cm)
Relay panel:	Rackmount, 12.1″H x 19.0″W x 4.0″D (30.7cm x 48.3cm x 10.2cm)

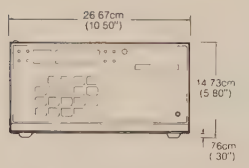
Weight:

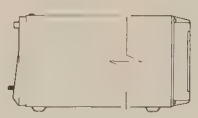
Mainframe:	22 lbs (10kg), fully loaded, 18 lbs (8.2 kg) minimum
Relay Panel:	9.25 lbs (4.2 kg)

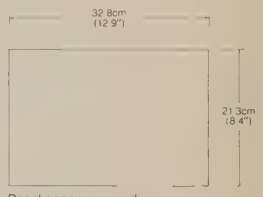
Temperature:	
Operating:	0° to 50°C (32° to 122°F)
Storage:	−20° to 60°C (−4° to 140°F)
Humidity:	10% to 90%, non-condensing
Input power:	
Mainframe:	Jumper selectable, 100±10%/115±10%/ 215±10%/230±10% VAC. 30 Watts max., 50, 60, 400 Hz
Relay panel:	100/120 VAC, 50/60 Hz, 200/240 VAC, 50/60 Hz, or 24 VDC±5%. 14 Watts max.
Non-volatile memory:	Ni-Cad battery back-up. Minimum 30 days memory protection when fully charged.
Program protection:	Internal switch for data security.
Auto Restored Clock:	Time corrected at power-on. Accuracy: ±.05%

Specifications subject to change without notice.

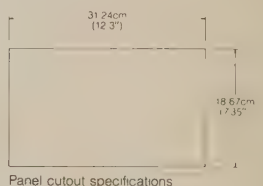








Panel space required



Panel cutout specifications

Find out how the Minitrend 205 fits your application.

The 205 is designed for bench-mount in its standard form. Options include a carrying handle that doubles as a tilt stand for bench use, panel mounting and rack mounting hardware.

Optional accessories include extra operator's manuals, maintenance manuals, and additional thermal paper. These are detailed in the Ordering Guide.

We'd like the opportunity to provide an in-depth explanation of how the Minitrend 205 meets your needs, now and in the future. For specifics, contact your local Doric representative or write us at the address below.

Your Doric representative...

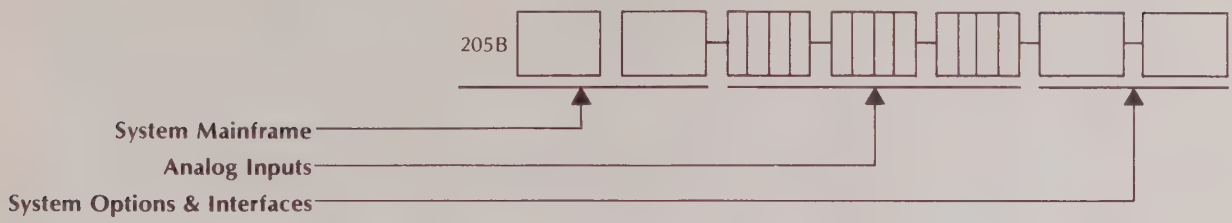
Doric Scientific Division
Emerson Electric Co.
3883 Ruffin Rd., San Diego, CA 92123-1898
In California call (619) 565-4415
Toll Free (800) 854-2708, Telex: 249031
Cable: AUTOZERO (San Diego)

In Europe: Rosemount AG
Doric Scientific Division
P.O. Box 363
Arbachstrasse 2
CH-6340, Baar-Inwil
Switzerland
Telephone: (41) (42) 33-37-77
Telex: (845) 868923

DL24/1 86/8M JA

Data Logger Configuration Guide

(Prices are USA list and subject to change without notice)



Minitrend 205 System

MODEL	DIGITAL MULTIPOINT RECORDER	BASE
205B	Main chassis with keyboard programmable point skip, log interval, manual/auto scan, digital clock, Julian calendar, nine alarms and thermal printer. Includes power cord and operator's manual and one pack of paper. (When using RTD or Thermistor MUX's, 1 each 205B-SC02 per main chassis is required for calibration.	$2,450

CODE	INPUT POWER	ADD
1	115 VAC ±10%, 50-60, 400 Hz	N/C
2	230 VAC ±10%, 50-60, 400 Hz	
3	100 VAC ±10%, 50-60, 400 Hz	
4	215 VAC ±10%, 50-60, 400 Hz	

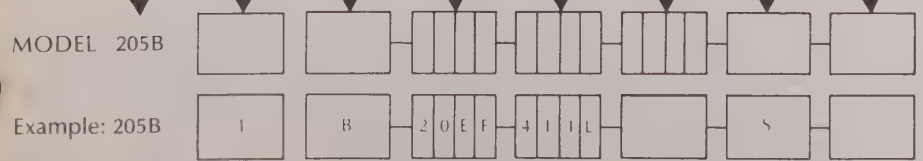
CODE	SYSTEM INPUT FUNCTION DESIGNATOR	ADD
A	Table A Input Functions (7500) } See "Range Selection Guide"	N/C
B	Table B Input Functions (7501)	
C	Table C Input Functions (7502)	

CODE	#1 MUX BOARD/RANGE DESIGNATOR (POINTS 1-12)*	ADD
1XXX	Thermocouple (Table A)	$525
2XXX	Thermocouple/Voltage (Table B or C)	525
3XXX	RTD (Table B or C) (Requires 205B-SC02 for calibration)	525
4XXX	Current (Table B or C)	525
5XXX	Linear Scaling VDC (Table B or C)	525
6XXX	Thermistor (Table B or C) (Requires 205B-SC02 for calibration)	525

CODE	#2 MUX BOARD/RANGE DESIGNATOR (POINTS 13-24)*	ADD
1XXX	Thermocouple (Table A)	525
2XXX	Thermocouple/Voltage (Table B or C)	525
3XXX	RTD (Table B or C) (Requires 205B-SC02 for calibration)	525
4XXX	Current (Table B or C)	525
5XXX	Linear Scaling VDC (Table B or C)	525
6XXX	Thermistor (Table B or C) (Requires 205B-SC02 for calibration)	525

CODE	#3 MUX BD/RANGE DESIGNATOR (PTS 25-36)*	ADD
1XXX	Thermocouple (Table A)	525
2XXX	Thermocouple/Voltage (Table B or C)	525
3XXX	RTD (Table B or C) (Requires 205B-SC02 for calibration)	525
4XXX	Current (Table B or C)	525
5XXX	Linear Scaling VDC (Table B or C)	525
6XXX	Thermistor (Table B or C) (Requires 205B-SC02 for calibration)	525

CODE	OPTION PLUG-IN CARDS	ADD
S	Serial I/O (RS232 & 20mA)	$525
A	Alarm Relay I/O (common alarm & logic output to alarm relay panel)	425



Order #:

Description:

***Note:**
RTD and Thermistor MUX's are 8 point MUX's; unused channels must be skipped. Identify range designator "XXX" to complete code. (See range selection tables page 2.)

RANGE SELECTION TABLES

TABLE A. INPUT RANGE SPECIFICATIONS (LSI 7500)

Function Designator	12 Pt. Mux Designator	Range Designator	Type of Input	Range	Resolution
A	1	0JF	Iron/Constantan	−328 to +1712°F	1°
		0JC	Iron/Constantan	−200 to +933°C	
		0KF	Chromel/Alumel	−208 to +2551°F	
		0KC	Chromel/Alumel	−133 to +1399°C	
		0TF	Copper/Constantan	−328 to +751°F	
		0TC	Copper/Constantan	−200 to +399°C	
		0RF	Pt-13%-Rhodium	+32 to +3251°F	
		0RC	Pt-13%-Rhodium	0 to +1788°C	
		0SF	Pt-10%-Rhodium	+32 to +3251°F	
		0SC	Pt-10%-Rhodium	0 to +1788°C	
		0BF	Pt-30%-Rhodium	+912 to +3392°F	
		0BC	Pt-30%-Rhodium	+489 to +1866°C	

TABLE B. INPUT RANGE SPECIFICATIONS (LSI 7501)

Function Designator	12 Pt. Mux Designator	Range Designator	Type of Input	Range	Resolution
B	2	0KF	Chromel/Alumel	−208 to +2551°F	1°
		0KC	Chromel/Alumel	−133 to +1399°C	
		0EF	Chromel/Constantan	−327 to +1951°F	
		0EC	Chromel/Constantan	−199 to +1066°C	
		FCF	(DIN) Iron/Constantan	−327 to +1651°F	
		FCC	(DIN) Iron/Constantan	−199 to 899°C	
		CCF	(DIN) Copper/Constantan	−327 to +1111°F	
		CCC	(DIN) Copper/Constantan	−199 to +599°C	
		K1L	Linear Voltage	−10 to 25mV	10μV
		K2L	Linear Voltage	−100 to 250mV	100μV
		K3L	Linear Voltage	−1 to 2.5V	1mV
		K4L	Linear Voltage	−10 to 25V	10mV
		K6L	Linear Voltage	−50 to 100V	100mV
	3	PT1	Platinum RTD,α=.00385,Ro=100Ω	−387.9 to 999.9°F	0.1°
		PT2	Platinum RTD,α=.00392,Ro=100Ω	−387.9 to 999.9°F	0.1°
		PT3	Platinum RTD,α=.00385,Ro=100Ω	−387 to 1632°F	1°
		PT4	Platinum RTD,α=.00392,Ro=100Ω	−387 to 1632°F	1°
		PT5	Platinum RTD,α=.00385,Ro=100Ω	−233.3 to 887.8°C	0.1°
		PT6	Platinum RTD,α=.00392,Ro=100Ω	−233.3 to 887.8°C	0.1°
		CUF	Copper RTD, 10Ω	−75 to 400°F	1°
		CUC	Copper RTD, 10Ω	−60 to 200°C	1°
	4	I1L	4-20mA Current	Factory Set 0-100.0%	Variable Scaling*
		I2L	10-50 mA Current	0-100.0%	
	5	K5L	Linear Voltage 0-200 VDC	Nominally Factory Set for 0-5 V = 1-100%	Variable Scaling*
	6	THF	Thermistor, YSI-700	−22.0 to 212.0°F	0.1°
		THC	Thermistor, YSI-700	−30.0 to 100.0°C	0.1°

TABLE C. INPUT RANGE SPECIFICATIONS (LSI 7502)

Function Designator	12 Pt. Mux Designator	Range Designator	Type of Input	Range	Resolution
C	2	0KF	Chromel/Alumel	−208 to +2551°F	1°
		0KC	Chromel/Alumel	−133 to +1399°C	
		0EF	Chromel/Constantan	−327 to +1951°F	
		0EC	Chromel/Constantan	−199 to +1066°C	
		0JF	Iron/Constantan	−328 to +1712°F	
		0JC	Iron/Constantan	−200 to 933°C	
		0TF	Copper/Constantan	−328 to +751°F	
		0TC	Copper/Constantan	−200 to +399°C	
		K1L	Linear Voltage	−10 to 25mV	10μV
		K2L	Linear Voltage	−100 to 250mV	100μV
		K3L	Linear Voltage	−1 to 2.5V	1mV
		K4L	Linear Voltage	−10 to 25V	10mV
		K6L	Linear Voltage	−50 to 100V	100mV
	3	PT1	Platinum RTD,α=.00385,Ro=100Ω	−387.9 to 999.9°F	0.1°
		PT2	Platinum RTD,α=.00392,Ro=100Ω	−387.9 to 999.9°F	0.1°
		PT3	Platinum RTD,α=.00385,Ro=100Ω	−387 to 1632°F	1°
		PT4	Platinum RTD,α=.00392,Ro=100Ω	−387 to 1632°F	1°
		PT5	Platinum RTD,α=.00385,Ro=100Ω	−233.3 to 887.8°C	0.1°
		PT6	Platinum RTD,α=.00392,Ro=100Ω	−233.3 to 887.8°C	0.1°
		CUF	Copper RTD, 10Ω	−75 to 400°F	1°
		CUC	Copper RTD, 10Ω	−60 to 200°C	1°
	4	I1L	4-20mA Current	Factory Set 0-100.0%	Variable Scaling*
		I2L	10-50 mA Current	0-100.0%	
	5	K5L	Linear Voltage 0-200 VDC	Nominally Factory Set for 0-5 V = 1-100%	Variable Scaling*
	6	THF	Thermistor, YSI-700	−22.0 to 212.0°F	0.1°
		THC	Thermistor, YSI-700	−30.0 to 100.0°C	0.1°

*Variable Scaling Offset: −1000 to 2000 counts
Span: 100 to 2500 counts

MINITREND™ 205

ACCESSORIES, ADD-ONS, SPARE PARTS AND SERVICE

SYSTEM ADD-ONS AND SPARE PARTS	ITEM CODE	PRICE
THERMOCOUPLE MUX CARD for use with LSI 7500 (Table A)	205B1XXX	$605
THERMOCOUPLE/VOLTAGE MUX CARD for use with LSI 7501 and 7502 (Table B and C)	205B2XXX	605
RTD MUX CARD*, 8 Channel (Requires 205B-SC02 for calibration) for use with LSI 7501 and 7502 (Table B and C)	205B3XXX	605
CURRENT MUX CARD for use with LSI 7501 and 7502 (Table B and C)	205B4XXX	605
VARIABLE SCALING VOLTAGE MUX CARD for use with LSI 7501 and 7502 (Table B and C)	205B5XXX	605
THERMISTOR MUX CARD* for use with LSI 7501 and 7502 (Table B and C)	205B6XXX	605
SERIAL I/O switch selectable full duplex and baud rates (110-9600), stop bits and parity. Automatically recognizes whether RS-232-C or 20mA current loop interface (by cable wiring).	205B-OPTS	580
ALARM RELAY I/O with common relay (Form C, 5 amp non-inductive load) and logic output lines to alarm relay panel	205B-OPTA	475
LSI 7500 chip for Table A ranges	205B-LSIA	110
LSI 7501 chip for Table B ranges	205B-LSIB	110
LSI 7502 chip for Table C ranges	205B-LSIC	110
ALARM RELAY PANEL rack mount (19"W x 12"H x 4"D [48 26cm x 30 48cm x 10.16cm]) includes 10 ft (3m) interface cable to 205B Requires Option A. 110/220 VAC; 24 VDC, ten Form C, (2 amp, non-inductive load) relays	205B-ARP1**	580

PERIPHERALS

Consult factory for information regarding adaptability and availability of peripherals. We can provide video display terminals, cassette recorders, tape drives, personal computers, printers, etc

ACCESSORIES		
• RACK MOUNT ADAPTER, adapts unit to EIA 19" rack (8.5" [21.59cm]H)	205B-00W6	$125
• PANEL MOUNT KIT, panel cutout 7 35" (18.67cm)H x 12.3" (31.24cm)W	205B-00W1	$ 60
• BENCH TILT STAND/CARRYING HANDLE	205B-0010	$ 30
• VINYL CARRYING CASE	205B-0068	$ 75
• EXTENDER SERVICE CARD FOR CPU BOARD	205B-SC01	$125
• EXTENDER SERVICE CARD FOR MUX BOARD (Required to calibrate RTD and Thermistor Mux Cards)	205B-SC02	$ 75
• EXTENDER SERVICE CARD FOR POWER SUPPLY BOARD	205B-SC03	$ 75
• EXTENDER SERVICE CARD FOR I/O BOARDS	205B-SC04	$125
• PAPER, THERMAL, ROLL (48 rolls/case, 96 feet/roll [29m])	205B-PPR1	$ 85/case
• PAPER, THERMAL, FANFOLD (25 packets/case, 250'/packet [76m])	205B-PPR2	$110/case
• FANFOLD PAPER ATTACHMENT, catches & refolds paper	205B-0030	$ 35
• ROLL PAPER ATTACHMENT, replaces standard fanfold paper hardware	205B-0032	$ 40
• STAINLESS STEEL INSTRUMENT TAG, unmounted, 2 88" (7.32cm)H x 1 75" (4 45cm)L TYPE 301, (20GA) Specify inscription: 6 lines max, 20 characters max per line	205B-0066	$ 35

SERIAL I/O CABLES

Standard interface cable for use with either Serial I/O Port. All cables are 6 ft. in length (1.8m). Connector configurations of cable in parenthesis

RS232C, 205 (male) to terminal (male)	205B-0040	$ 65
205 (male) to modem (male)	205B-0041	
205 (male) to terminal (female)	205B-0043	
205 (male) to IEEE-488 adapter	205B-0046	
20mA CURRENT LOOP, 205 (male) to TTY (Spade lugs)	205B-0042	
205 (male) to ADM-3A (male)	205B-0044	

INTERFACE ADAPTER

RS232C to IEEE-488	205B-☐BUS	Consult Factory
RS232C to IEEE-488, with rack mounting hardware	205B-☐BUSR	Consult Factory

205B-☐BUS / 205B-☐BUSR

- 1 — 115 ±10% VAC, 60Hz
- 2 — 230 ±10% VAC, 60Hz
- 3 — 115 ±10% VAC, 50Hz
- 4 — 230 ±10% VAC, 50Hz

*Requires 205B-SC02 for calibration

**Designate Power Required

DATA AND SERVICES

Operators Manual (Extra, one supplied with instrument)	205B-HBK1	$25.ea.
Maintenance Manual	205B-HBK2	$60.ea.

OUTLINE DIMENSION DRAWINGS

(Drawings are blueprints. Reproducible sepia, specify, add $10.00 ea.; certified add $10.00 ea.)

205 Mainframe, bench mounting	205B-DRBA	$15.ea.
panel mounting(205B-00W1 installation and cutout)	205B-DRBB	$ 5.ea.addit'l copy of same drawing
rack mounting (205B-00W6 installation)	205B-DRBC	
tilt stand/handle (205B-0010 installation)	205B-DRBG	
Alarm relay panel (205B-ARP1)	205B-DRBD	
Reproducible sepia of any of the above order:	205B-DRS☐	$25. 1st $15.ea.addit'l
Certified copies of any of the above order:	205B-DCB☐	$25. 1st $15.ea.addit'l
Certified, reproducible copies of any of the above order:	205B-DCS☐	$35. 1st $25.ea.addit'l

SERVICES

START-UP ASSISTANCE, a Doric field service	1 day	205B-SA01	$2,000.
engineer will travel to your site to inspect and	2 days	205B-SA02	$2,695.
verify your completed installation and will train	3 days	205B-SA03	$3,390.
your operators and/or supervisors in the unit's	4 days	205B-SA04	$4,085.
operation. Charges include all travel and expenses	5 days	205B-SA05	$4,780.

FACTORY CHECKOUT SERVICES

Customer witnessed factory acceptance tests	205B-FACT	$350./day
Factory checkout with customer furnished peripheral	205B-OCFP	$350. min.
Factory checkout with Doric supplied substitute terminal	205B-OSTF	$350. min.

SPARES

Basic Spare Parts Kit. Includes power supply, CPU, mother board and display assemblies; 1 ea. thermal paper, service manual; miscellanous spare parts. LSI chip should be ordered as a separate item. (consult factory for spare parts kit for Model 205A.)

205B-KIT☐ — $1,550

1—115V, 50-60 Hz
2—240V, 50-60 Hz
3—100V, 50-60 Hz
4—215V, 50-60 Hz

(A discount of 15% will be applied whenever the spare parts kit [205B-KIT☐] is purchased on the same order with any 205 mainframe.)

NOTE: Use ADD-ON prices when ordering spare option, interface or MUX assemblies.

CSA APPROVAL — RACK MOUNT CONFIGURATION ONLY

Consult factory for price and delivery.

*Prices and Specifications subject to change without notice.

DORIC

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Telex: (845) 8868923

DORIC

DORIC DIGITRACK™ 360

IBM PC Compatible Data Collection System

ADDS OFFLINE, MASS DATA STORAGE TO OUR FIELD PROVEN DATALOGGERS

- Encodes analog measurements on 5 1/4" disks in IBM PC DOS 2.0- compatible format.
- For computers compatible with IBM PC, XT or AT
- Data from up to 500 channels using Doric 245, 235, and 205 data loggers.
- Up to 25,000 measurements per disk.
- 4K input buffer prevents data loss during disk change.
- Easy interface to Lotus 1-2-3 and Symphony for comprehensive data analysis and display.
- Offline continuous logging reduces computer tie-up and adds flexibility to your PC.
- RS232C terminal and modem ports.
- Choose simple front panel or remote operation
- Battery-backed data protection.

Doric offers a variety of dataloggers for your measurement needs:

Minitrend™ 205	– up to 36 points, portable	
Digitrend® 235	– up to 100 points	20 point A/D multiplexers up to 1 mile
Digitrend® 245	– up to 500 points	away from mainframe.

Digitrack™ 360

SPECIFICATIONS

DISK DRIVE: 48 TPI, 40 Track Double sided

CAPACITY: 360 K bytes (equivalent to 25,000 data records)

INPUT BUFFER: 4 K CMOS battery-backed

MEDIA: 5 1/4" Double sided double density floppy disk

RECORDING FORMAT: IBM-PC DOS version 2.0 compatible

INTERFACE, TERMINAL AND MODEM: RS232C, female connectors

FRONT PANEL CONTROLS: READ, WRITE, FORMAT, ONLINE, STANDBY

TRANSMISSION: Full duplex, asynchronous

BAUD RATE: Selectable: 110, 150, 300, 1200, 2400, 4800, 9600 or 19.2K

SIZE: Width 7.25" (184mm)
Height 5.5" (190mm)
Length 14" (356mm)

WEIGHT: 9.15 lbs. (4.15 kg)

DATA: ASCII format

POWER SUPPLY: 90-130 VAC 50/60 Hz
180-260 VAC 50/60 Hz
50VA

TEMPERATURE AND HUMIDITY RANGE: 10°C to 50°C media dependent 8 to 80% relative humdity, non-condensing

FUNCTIONAL OVERVIEW

HANDSHAKE: Uses X-on, X-off or DTR, DSR, CTS or RTS signals-switch selectable.

DIRECTORY: Disk title, number of free bytes, file-names, number of bytes in file and number of files.

STATUS: Ready, write protect, mode, error and disk full.

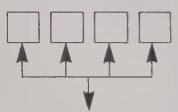
MONITOR: Data received may be passed to terminal interface.

DISK FULL: Disk may be changed without exiting 'write' mode allowing continuous operation.

POWER FAIL: In 'write' mode, machine status and all data in RAM is saved for 28 days.

AUTO-ANSWER: Unit can log data at a remote site over terminal interface. Auto answer modem on Modem interface can be used to retrieve data without site visit. Bell 212/103 compatible.

ORDERING INFORMATION



– DT360

Specify 205B, 235A, or 245A

Digitrack 360 Data Collection Unit

includes: disk drive
interface program disk
interconnect cable
power cord
operators manual

Consult your nearest representative or factory for pricing information

Represented by:

DORIC SCIENTIFIC DIVISION
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San Diego, California 92123-1898
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Toll Free (800) 854-2708, Telex 249031
Cable: AUTOZERO (SAN DIEGO)

In Europe:
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CH -6340 Baar-Inwil
SWITZERLAND
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DL55/5-86/15M

DORIC

Digitrend® 245—the data logger with far-reaching capabilities.

We've gone to great lengths to satisfy your data logging needs.

Well over a decade of data logging experience and innovation come together in the remarkable Digitrend® 245.

A prime case in point is the analog multiplexer and analog to digital converter—the cornerstone of any data logger design. This is the business end of the instrument, and we've made it our business to be on the leading edge of this difficult technology since introducing the world's first mass-production data logger in 1971. Since that time, we've continued to innovate, developing new ways to fill your new requirements better than ever.

Several years ago, we introduced the unique Doric FEM (Front End Module) concept, with special advantages still unmatched by anyone. Building on this proven technology, we've created the advanced Digitrend 245A. Complete with the added power of new standard math, communications and alarm features. The most up-to-date components. And the ability to monitor more points and more types of processes than ever before.

The result is a versatile, cost-effective instrument that satisfies industrial and laboratory requirements for measurement, display and recording of up to 500 points with high accuracy, easy operation, built-in reliability, and the flexibility to meet the future with confidence.

Modular design, built around the unique FEM.

System advantages are due in great part to the time-tested Doric FEM. This completely self-contained analog to digital subsystem reaches right to the process to provide full 16-bit (0.5μV) resolution and exceptional accuracy.

A family of FEMs is available to tailor the 245A to your application. One highlight is the intrinsically safe FEM, certified by Factory Mutual as safe for operation in hazardous environments (e.g. petrochemical processing and munitions manufacturing).

All FEMs are packaged in a rugged cast aluminum housing, designed to handle 0° to 70°C environments. This way, the FEM (which handles 20 process inputs) can be installed close to the sensor to reduce costly sensor extension cabling. Communications to the 245A mainframe or satellite —which can be a mile away from the FEMs—is over a single, low-cost, 4-wire digital cable.

The mainframe accommodates up to five FEMs, handling 100 points. To

Digitrend 245A Mainframe

Rugged, self-contained FEMs (Front End Modules) each pick up 20 analog signals at the process. FEMs can be up to a mile from the mainframe, installed inside it, or connected to satellite units which can be as far as 1,000 feet from the mainframe. When fully expanded, the system can accommodate 500 analog and 96 digital inputs.

monitor more, simply add satellite 245S modules. These can be up to 1000 feet from the mainframe—connected with 4-wire cable—to handle a total of 500 points.

Configuration flexibility, now and in the future.

Digitrend 245A's modular design offers the versatility you need to apply Doric's field-proven performance to your processed monitoring tasks. You can use this compact logger as a bench-top unit for lab duty—it weighs just 40 pounds fully optioned. Or rack mount it, for instance, as part of a computer control system. Or panel mount the 245A for simple integration into your instrumentation panel or your OEM product.

You can easily accommodate a wide range of input measurements, including thermocouple inputs, millivolts from other low-level sensors, plus higher voltage, current inputs, RTDs and resistance.

You get the output the way you want it—in easily understood engineering units—on the front panel display, built-in system printer, at your computer, terminal, or other peripherals.

An all-around smart buy.

Digitrend 245A is accurate, versatile, simple to use, and easy to expand. It's also designed for total cost-effectiveness, starting with an easy entry price because you buy exactly what you need. Further economies come from FEMs and low-cost wiring that can save you thousands of dollars on installation.

For ongoing savings, simple operation reduces training time and related expenses. And as you'd expect with Doric equipment, inherently reliable design combines with rugged components to pare maintenance and downtime costs to the bare minimum.

Your financial advantages stretch far into the future. When you want to monitor more points, just add more FEMs and save on installation wiring once again. Also, new capabilities can be added with plug-in option cards.

Here's one instrument you can specify with confidence today. Because you know the 245A will be able to handle tomorrow's requirements as well.

Doric FEM

Digitrend 245S Satellite

Data logging the way you want it.

Digitrend 245A collects up to 500 analog input measurements, then conditions the signals in the mainframe. The results are displayed on a crisp, clear digital readout and expressed in engineering units such as temperature, pressure, flow, level, and pH. Further, the system can monitor as many as 96 digital inputs, grouped to form BCD data or received individually from limit or valve-position switches for status or event sequence monitoring.

In addition to on-demand (manual) logging, the system can be set up to perform a number of simultaneous automatic features. These include up to 10 logs at independently specified time intervals on selected points or groups of points in alarm (periodic logging), as well as continuous alarm monitoring and logging of selected points on alarm transition. The 245A can even be programmed to skip points to enhance its scanning speed.

As many as fifteen jobs can be processed simultaneously, selected from the following table:

User Job	Comments
Display	Display data on local readout
Log	Demand log (manual)
User-Programmed Timed Interval Log	Maximum of 10 (periodic logs)
Standard Time Interval Logs	Every minute, hour, and/or day
Alarm Log	–
Contact Status Monitoring	–
Sequence of Events Recording	–
Point Average/ Group Average/ Point Difference/ Floating Alarm Limits/ Rate of Change	System needs may dictate using any given function more than once. Each time a function is used, it counts as a job.

Easy operation is assured by simple command sequences. For instance, pressing just seven keys will log points one through nine.

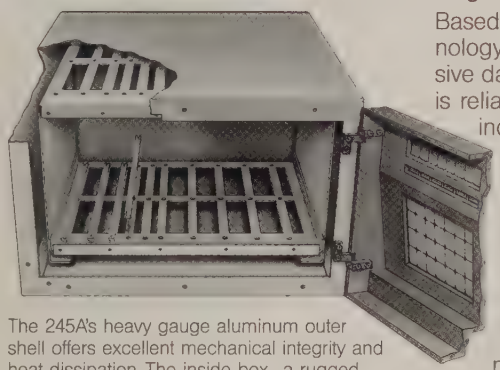
Built-in noiseless thermal printer provides a permanent record, complete with data, time and engineering unit symbols.

Designed for easy, accurate operation.

Even with all it can do, the 245A is extremely simple to use. The front panel keyboard—splash-resistant and electronically shielded for environment protection—has just 10 numeric and 18 function keys. Operators require minimal training and appreciate the way the 245A simplifies data logging in your busy work environment. And there's far less possibility of human errors.

To perform a routine log, the operator hits "clear," then the "log" key, tells the system where to log the data, and then enters the points to be logged. A single log command can handle up to four groups of points.

The sequence to set up the job for logging is always straightforward, logical, and even conversational. Still, we've provided a "shorthand" feature for even easier entry. With the 245A, preprogrammed logs can be put on Fast Call for execution with a simple keystroke sequence. Suppose four groups of points were to be routinely logged by the operator. This log command could be set up as Fast Call task #1. To perform the log, the operator simply enters the commands "clear" "1" "run." In addition, four Fast Call tasks can be independently started by external switch closures.



The 245A's heavy gauge aluminum outer shell offers excellent mechanical integrity and heat dissipation. The inside box—a rugged aluminum electronics chassis—houses the PC boards. Additional construction highlights are gold contacts on all connectors, a double-thick motherboard, and plenty of protective circuitry.

Output flexibility to meet every need.

Digitrend 245A offers the operational versatility most often required to implement a full spectrum of data logging tasks from simple to complex. Up to 10 different timed-interval logging sequences can be programmed—plus demand logging and alarm logging. And each logging output can be directed to one or more of many recording and display devices. For example...

- The local 12-column, 2.5 lines/second thermal printer, recording on roll or fanfold paper. (The fanfold paper option comes with a convenient paper take-up tray to work unattended.)
- The two standard Serial I/O ports can be connected to computers, recorders, modems, terminals or other peripherals.

Logging of the input data can be performed at several different time intervals to meet a variety of recording and control requirements. Each of the timed interval logs can be programmed for one minute to 100-hour intervals (or one second to 100-minute intervals) and assigned as many as four groups of points. (Example: Log on the printer points 1 to 5, 8 to 16, 25, and 50 to 99 every 30 minutes.)

Ongoing assurance of data reliability.

Based on proven microprocessor technology and backed by Doric's extensive data logger experience, the 245A is reliable by design. Key features include box-within-a-box construction for high mechanical integrity, packaging that attenuates the effects of RFI/EMI and electrostatic discharge, plus coated PC boards for environmental protection.

In addition, we've incorporated on-line diagnostics to monitor performance. To assure accurate information processing, fault-tolerant software continuously monitors the validity of instruction and address codes. If there's an inappropriate code, software detects and rejects the error. Program execution returns to a known good state, then restarts. Time of error is logged, along with a diagnostic message. There's also Doric's advanced hardware watchdog that monitors repetitive operations and resets the instrument if these routines are interrupted in any way.

Double-protected memory.

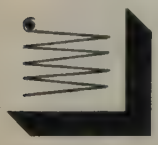
A low-power random access memory (RAM) stores critical program information, calibration constants, coefficients in engineering units, alarm setpoints and operating sequences. In the event of a power failure, auxiliary battery power maintains the RAM for more than thirty days. Through software interlocks and hardware watchdog circuitry, the RAM is also protected from the possibility of accepting bad information during periods of transient or faulty instrument behavior.

Large, easy-to-read digital display gives the operator the necessary facts, down to 0.1° resolution.

The flexibility of two standard Serial I/O ports provides broad communications capabilities and easy interface. Output can be:

Optimized for a computer and for a terminal.

Provided to a host.



Directed to a recorder, modem, or other peripheral.

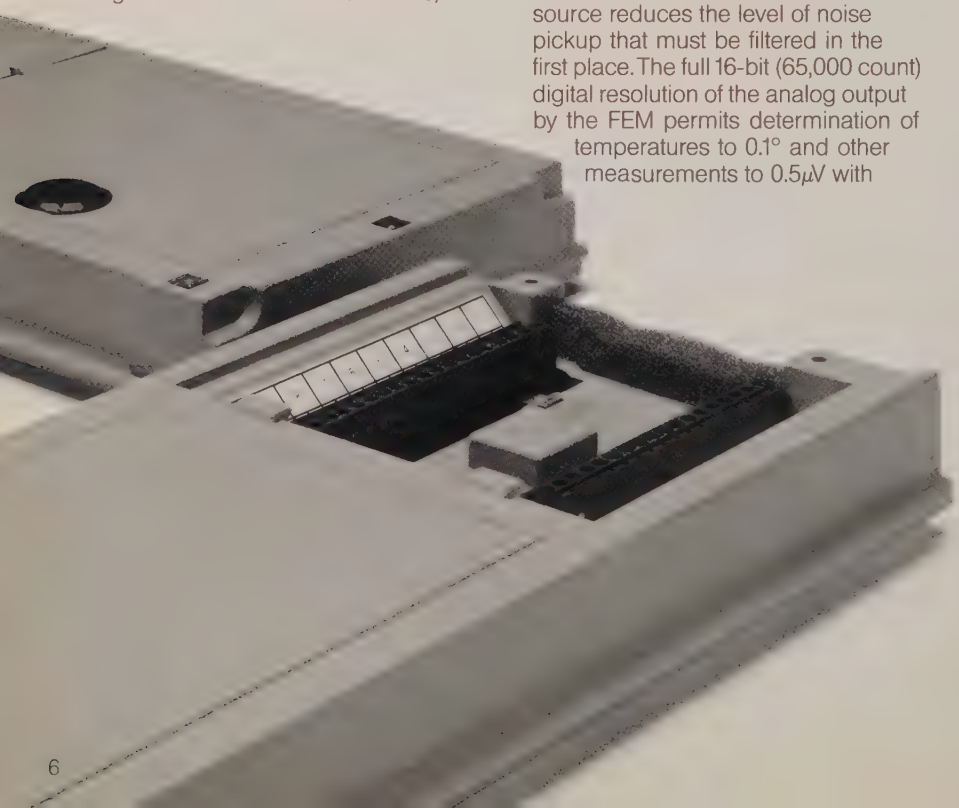
Details on Doric's outstanding family of FEMs.

Doric's exclusive FEMs make the 245A a stand-out system by delivering significant performance benefits and the lowest possible total installed cost, particularly in hazardous environments.

Each FEM is a completely self-contained analog-to-digital subsystem that handles up to 20 analog inputs. You add FEMs (and 245S satellites) to your system as your needs grow, expanding monitoring to as many as 500 analog points.

The compact FEM can be plugged directly into the mainframe or satellite, placed a short distance away, or located up to a mile from the mainframe. Once connections to the process are made, quick disconnect terminals assure easy swap-out of FEMs without undoing all your input connections.

Superior environmental specifications mean the FEM can be placed right where the measurement is, keeping the mainframe in a less harsh environment. Temperatures from 0° to 70°C pose no problems. Expensive environmental protection is often unnecessary, thanks to the rugged cast aluminum construction of the FEM housing and protective coating of the circuit assemblies.



High accuracy, low costs.

The FEM transmits reliable digital pulse signals for long distances. And there's no degradation of the information being transmitted from common mode voltage pickup, distributed capacitance effects, or spurious interference. Excellent noise rejection comes from dual-slope integration analog to digital conversion, combined with advanced filter design that provides 130 dB CMR for common mode voltages of up to 250V RMS, as well as superior RFI rejection. In addition, locating the FEM at the measurement source reduces the level of noise pickup that must be filtered in the first place. The full 16-bit (65,000 count) digital resolution of the analog output by the FEM permits determination of temperatures to 0.1° and other measurements to 0.5μV with accuracies of 0.01% reading or better.

As always, precision has its price. But with the Digitrend 245A, that price is remarkably low. First, the system is modular so you buy only the number of monitoring points you need. Even more important, however, is the way the FEM concept cuts installation costs to new lows.

Communications between the FEM, satellite, and mainframe take place over a simple 4-wire cable—two twisted shielded pairs—available for less than $1 per foot. There's no need to run hundreds of feet of costly thermocouple extension wires to the control location. Additional cost savings can result from reduced requirements for cable trays, conduit, and reduced labor charges in large installations. And you also avoid the high-priced alternative of transmitter hardware and power supplies.

FEMS may be installed in the mainframe as shown here, close to the mainframe for simple servicing, or up to a mile away. They may also be installed inside or outside the 245S satellite units. Since the FEM draws its power from the 4-wire cable, no local plug-in is required.

In hazardous environments, intrinsically safe FEMs cut costs even more.

Factory Mutual certification of the Digitrend 245A as intrinsically safe for hazardous environments is pending. With optional FEMs and barrier cards, the Doric system operates safely—and without expensive protection—in plants using any of the more than 50 explosive gases included in Groups A, B, C and D under Class 1, Division 1.

Up to 25 FEMs can be placed in a hazardous area as far as a 2500-foot radius from the mainframe or satellite, which is in a safe area. Each 20-point FEM interfaces to a single barrier card which has energy-limiting devices to shunt away or limit passage of electrical energy from the mainframe to the FEMs, even under abnormal operating conditions.

Doric's approach to safety in hazardous environments is very cost-effective and highly accurate. There's no need to buy an expensive explosion-proof housing. And there's no need to go to costly intrinsically-safe transmitters and barriers for each analog measurement.

Five FEMs and how to use them.

Doric's FEM family covers most common requirements for process and laboratory measurements. Here's how they are applied...

Solid-State Multiplexing FEM, our basic CMOS multiplexer, is used for thermocouple, mV and voltage inputs up to 2.2V. It's suitable for most industrial applications. All-solid-state design assures the longest, most reliable operation.

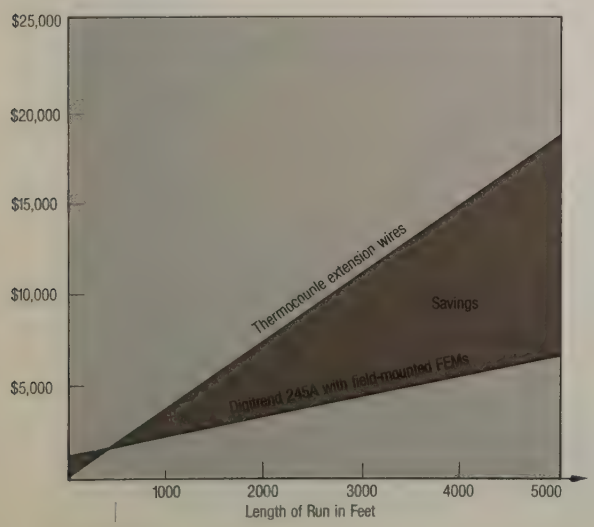
Universal Voltage FEM, our basic reed-relay multiplexer, is used for thermocouple, mV and voltage inputs up to 22V. It also goes in environments where differences in common mode voltage between points connected to that FEM are likely to exceed 6.5 volts. This level of channel-to-channel common mode voltage difference causes errors and sometimes damage to the solid state multiplexing FEM.

Current Transmitter FEM is a reed-relay multiplexer, specially set up to accommodate 20 standard (4 to 20 mA) transmitter signals. (For fewer transmitter inputs, the Universal Voltage FEM can be equipped with 20Ω, 0.1% low-temperature coefficient resistors to develop a millivolt signal for each transmitter input.)

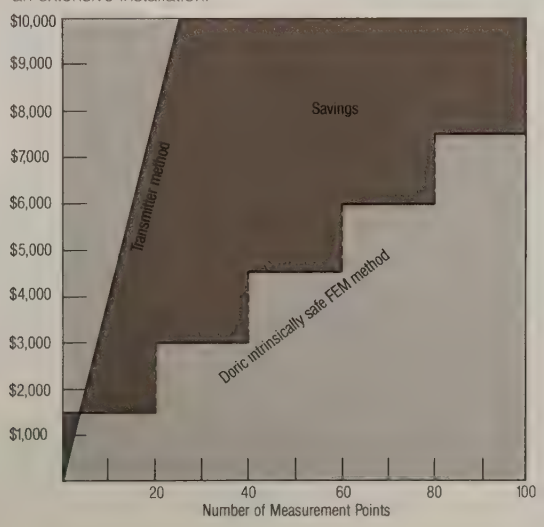
Solid-State RTD FEM is a solid-state unit that measures input from either 3 or 4-wire RTDs, with a resolution of up to 0.01° for a platinum RTD input. It is typically used in applications demanding high accuracy and stability. The RTD FEM can also be used with other resistance-type sensors and potentiometer inputs. All-solid-state design assures the longest, most reliable operation.

Reed RTD FEM is the reed-relay equivalent of the solid-state RTD FEM. It can be used in environments where differences in common mode voltages between points connected to that FEM are likely to exceed 6.5 volts. This level of channel-to-channel common mode voltage difference causes errors and sometimes damage to the solid-state RTD FEM.

Estimated Wire Costs for Connecting 20 Points. Often, up to half the cost of a data logger is in installation. This chart shows the dramatic savings possible by reducing wire costs alone. The comparison is made with Type J thermocouple extension cable (about $.18/ft per point) versus the simple two twisted pairs needed by the FEM concept and does not include installation labor.



Estimated Costs of Getting an Analog Signal Back from a Hazardous Area. If you're measuring five points or more, Doric can save you plenty. The chart's conservative, too, covering just the cost of transmitters versus our FEMs and barrier cards. Add in the cost of multiplexers (A-D conversion) for them—plus costs of cables and labor—and it's easy to see how Digitrend 245A can save tens of thousands of dollars for an extensive installation.



Extensive communications and math capabilities.

Flexibility is a strong point of the 245A's communications package. Two Serial I/O ports are standard; each can be optimized for and assigned to a terminal or computer interface.

With these ports and programmable Serial I/O selection, the 245A easily interfaces with a wide variety of peripherals and can act as the front end for a supervisory computer: personal, mini, or mainframe.

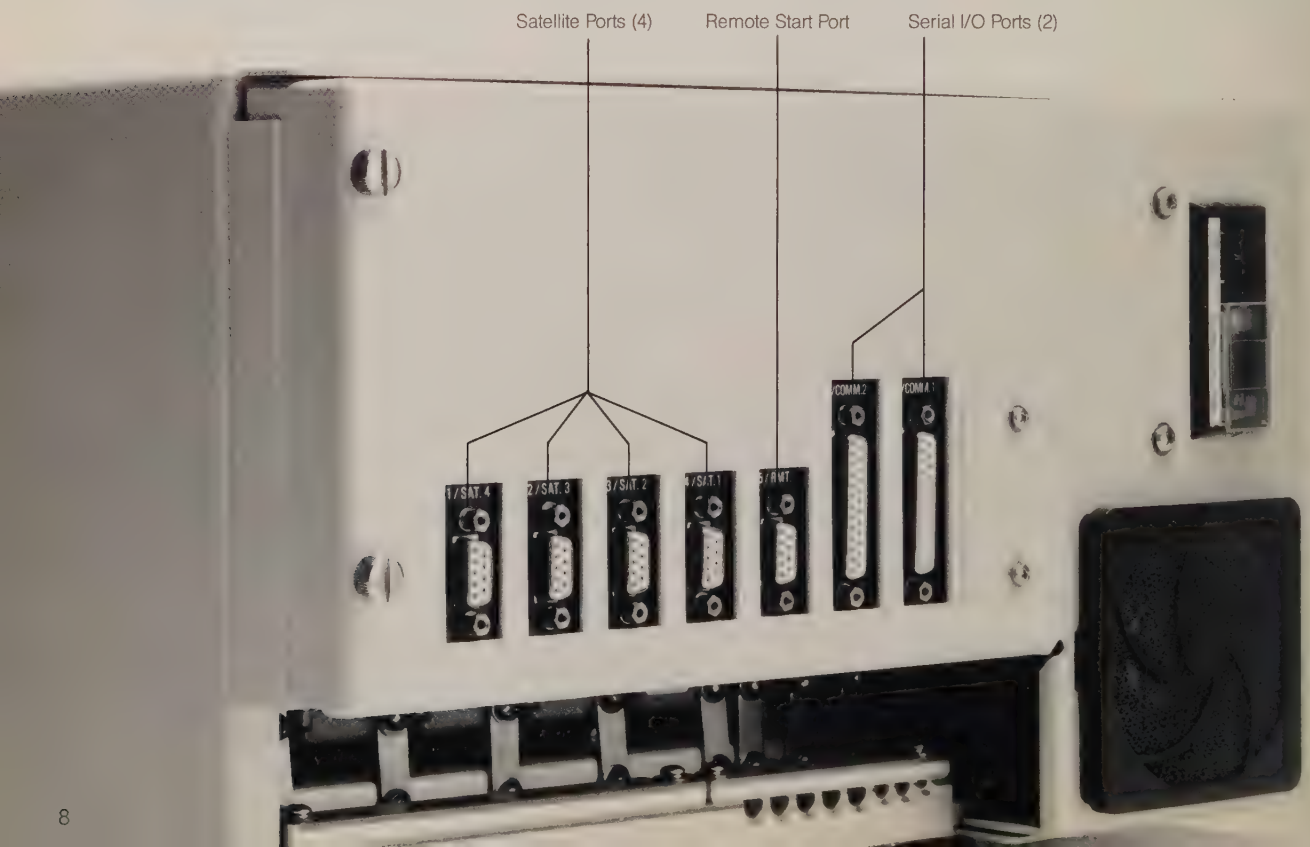
Formatting and protocol capabilities are fully programmable and reconfigurable to simplify interface and to provide greater applications flexibility. First, select RS-232C or 20 mA current loop by properly wiring the peripheral cable and plugging into the Serial I/O receptacle on the rear of the 245A. Use switches on the interface card behind the rear door to determine active or passive operating mode for current loop. Then go to the front panel—or use a serial port—to completely define the format and protocol.

Program functions include...

- ☐ Serial I/O port enable (terminal or computer) or disable
- ☐ Baud rate (110 to 9600)
- ☐ Character format (seven or eight bits, parity, one or two stop bits)
- ☐ Line control enable or disable
- ☐ Block control enable or disable
- ☐ Xon/Xoff enable or disable
- ☐ Full duplex or half duplex
- ☐ Characters per line
- ☐ Lines per block
- ☐ Delay
- ☐ Time out
- ☐ ACK character (up to 3 characters)
- ☐ NAK character (up to 3 characters)
- ☐ STX character (up to 3 characters)
- ☐ ETX character (up to 3 characters)
- ☐ Xon character
- ☐ Xoff character
- ☐ Prompt character(s)
- ☐ Line header (up to 12 characters)
- ☐ Line trailer (up to 12 characters)
- ☐ Block header (up to 12 characters)
- ☐ Block trailer (up to 12 characters)

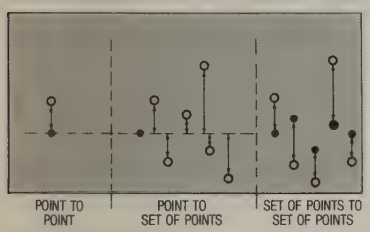
Peripherals.

Digitrend 245A can communicate with a wide range of computer and peripheral devices such as terminals, cassette and cartridge recorders, and modems.



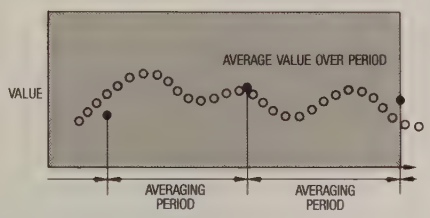
We've made Digitrend 245A a genuine math whiz.

Standard math capabilities cover everything you're likely to need to instantly convert raw data into useful engineering information. Calculations include point difference, mx+b (linear scaling and offset), point averaging, group averaging, floating alarm limits, minimum/maximum functions, rate of change, square root (for flow), F_O and F_H (specially designed for sterilization requirements).

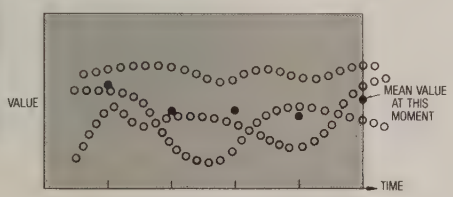


Point difference (function 104) lets you monitor and log the arithmetic difference or delta between points in the system. It can be used to compare one point with any other point or set of points, or to compare a set of points to another set. (Temperature differences are a prime example.) When alarm monitoring is utilized, a group of four common point difference alarm limits can be set up so that each point difference measurement may be tested against these limits.

mx+b linear scaling (function 107) lets you assign a unique linear scaling function to every analog input, and **engineering units** (function 108) let you apply any of up to 20 two-letter engineering unit designations to the results.



Point averaging (function 106) lets you monitor and periodically log the arithmetic average of each point in specified groups of points over time intervals of up to 100 hours. This lets you average out irrelevant short-term upsets to keep the focus on the trend of what you're monitoring. The average value for several points can be computed simultaneously with this powerful function.

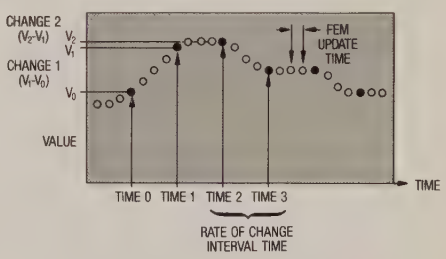


Group averaging (function 109) lets you compute the mean value for a designated group of points at the completion of a predetermined time interval.

This function computes a single group average, such as the group average of points 1 to 6, 12, and 15 to 39 at a specified interval like 30 minutes. Combine this function with alarm monitoring, and a single group of four alarm limits can be set so that each group mean can be tested against the limits.

Floating alarm limits (function 105) permit computing alarm limits by adding and/or subtracting a fixed offset for the mean value of a designated group of points to get **relative** information on how well one point is doing in relation to a computed floating reference value.

Minimum/maximum stores the highest and lowest values for each point. Values may be displayed, logged, etc. Since this function runs continuously, values are automatically updated when new highs and lows occur. The values (minimum and maximum) reset when a point is set up again.



Rate of change (function 111) indicates whether a point is moving up or down and how fast it is moving. Rate of change is calculated over a pre-programmed interval time in minutes or seconds. Information is displayed as engineering units per minute or second. Values may be assigned alarms.

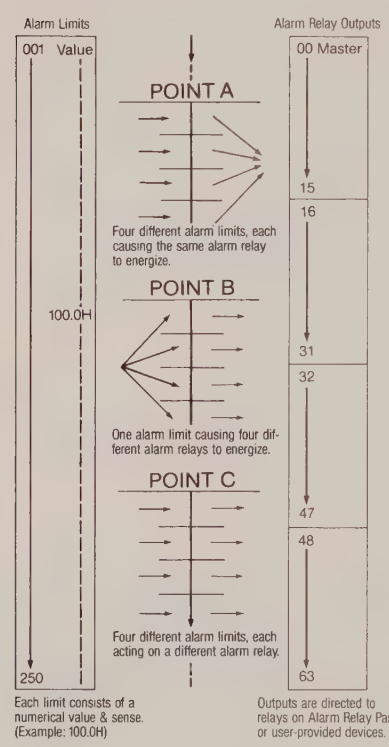
F_O and F_H (functions 112 and 113) let you input temperature channels, then automatically calculate the equivalent time for sterilization. Functions can be assigned to any point in the system. Values may be assigned alarms.

Square root (function 110) programs the value for specified points to be expressed as the square root of the input, when the input is a percent of full scale (function 17) only. Offset and scale (mx+b) may then be used for proper results.

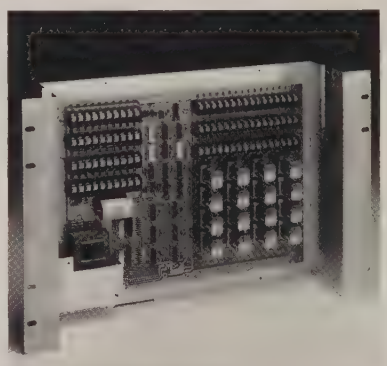
Total data logging solutions.

Extensive alarm monitoring functions.

Wide choice of alarm possibilities.



Standard alarm monitoring features provide the flexibility of 250 alarm limits, each assignable. Up to four alarm limits (high, low, high-high, low-low) can be assigned to every point in the system, analog or digital. Log of alarm conditions can be on demand, as one of the periodic logs, or as transitions into and out of alarm occur. The arrangement of the alarm limits is extremely flexible and greatly reduces the time-consuming and often limiting requirement of grouping setpoints. For instance, you can dedicate some limit values to individual inputs and assign others to cover groups of points.

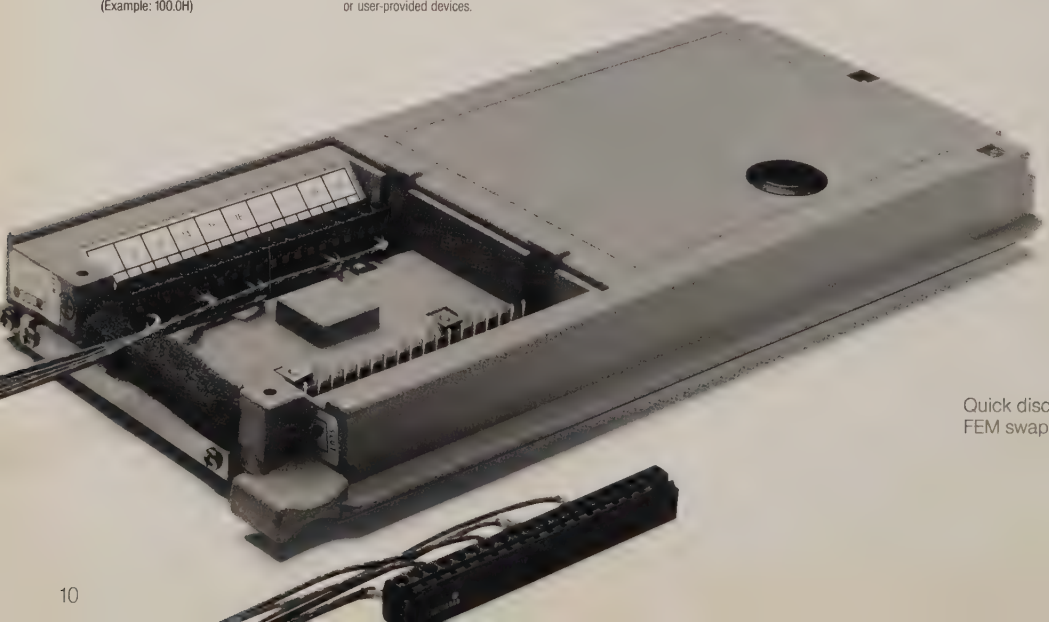


Alarm Relay Panel

Adding alarm contact closures.

Doric's ARP1 Alarm Relay Panel is a versatile system option. This is an annunciator panel interface with sixteen form-C (SPDT) electromechanical relay outputs, 2 A, 115 VAC or 28 VDC, non-inductive load. User terminations are provided for the relay outputs in the form of rugged, barrier-type screw terminals, each accommodating two 14-AWG connectors. Each panel can be configured to conform with either of two common alarm acknowledge sequences (ISA standard sequences A or A-4-5). Acknowledgement is via switch closure input to barrier-type terminals located on each Alarm Relay Panel, or by command to the 245A entered via the front panel or either Serial I/O port.

The 245A can support up to four Alarm Relay Panels, which can control alarm lights, audio devices, and other indicators. Total system capacity is 64 relays. The end result is a complete



Quick disconnect speeds and simplifies FEM swapping.

matrix of assignable alarm conditions and relays. A specific alarm limit can be used to trigger a series of relays, and several inputs can share an alarm limit value or relay.

Digital input card.

The digital input card (Option D) can be used in any of three ways:

1. Monitoring BCD inputs from digital instruments.
2. Scanning of contact status.
3. Capturing the sequence of fast-changing events—with one millisecond resolution—to establish causal relationships.

Each card can monitor up to 48 digital inputs, such as the status of valves, switched events, or the BCD outputs of digital instruments. Switches on the card adapt it to the type of signal to be processed. When used for BCD inputs, each card can be set up to accommodate either six 2-digit, three 4-digit, or two 6-digit words.

Inputs to the card are optically isolated and compatible with TTL/DTL/CMOS/contact closure. Up to two digital input cards can be used in the system, providing a total of as many as 96 digital inputs.

Easy to service. And factory guaranteed for two years.

Several key service-oriented concepts have been built into the Digitrend 245A. For openers, a hinged front door simplifies access to the front panel electronics and the thermal printer.

In addition, every system element with active electronic components is designed as a plug-in board. PC boards can be removed from the back of the instrument and re-inserted in the front test connectors for on-line troubleshooting. Problems are quickly pinpointed, and simple board swapping restores service fast.

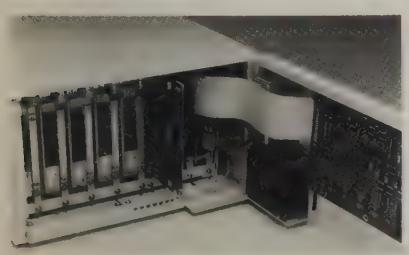
And most important from a maintenance standpoint, each FEM features quick disconnect input termination. Just pop off the connectors and plug them into a new FEM. This time-saving maintenance aid gets your data logger back on the air quickly, without disconnecting a single thermocouple or process wire.

Full factory support, Doric-style.

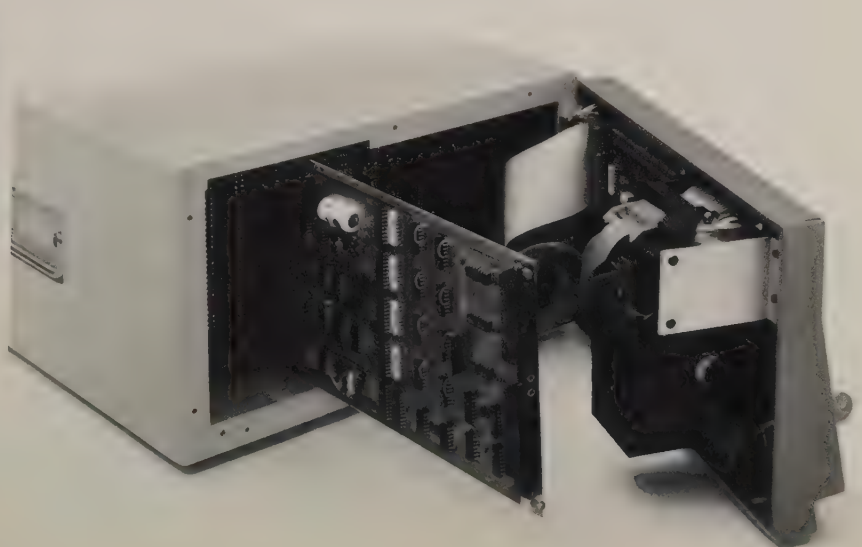
Digitrend 245A is backed by Doric, the first name in data loggers. Comprehensive services begin with application assistance, provided by knowledgeable sales representatives who can draw on the skills of a team of qualified application engineers at our corporate headquarters.

To get your system on-line fast, Doric provides operator training, at your site or ours, and startup assistance at a reasonable cost.

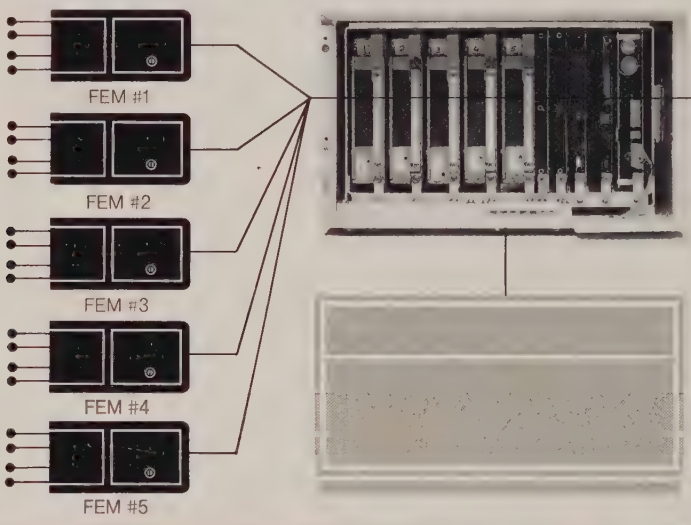
To keep you productive, we provide detailed service and maintenance documentation. We also offer service contracts and repairs through a network of responsive field service offices and service centers in the U.S. and abroad.



Plug-in PC boards can be removed from the rear (shown above), then inserted into test connectors in the front (right) for on-line troubleshooting.



Functional overview and capabilities summary.



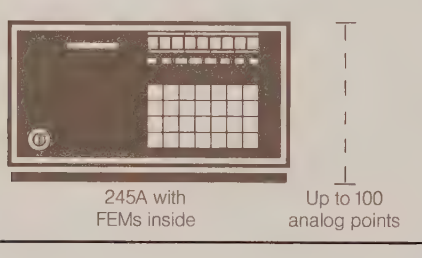
Analog Inputs
Up to 100 points with mainframe, 500 with satellites added
Up to 5000 feet from mainframe

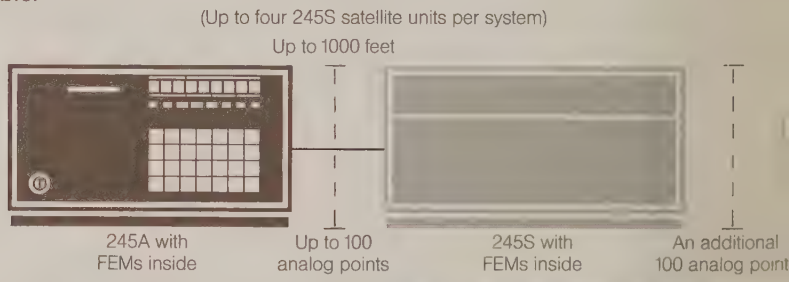
245A Mainframe
Handles up to five FEMs
Accommodates up to three option cards

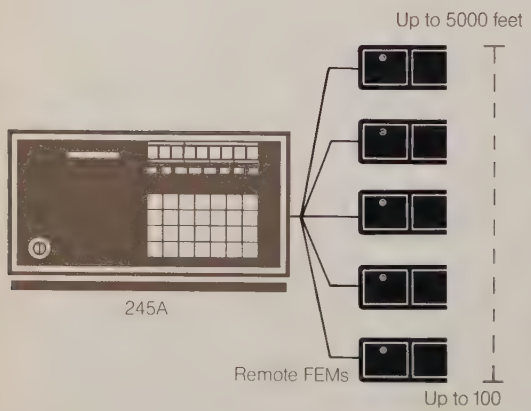
Reviewing this diagram helps to show how the Digitrend 245A can be configured to your exact needs. Note that the standard general-purpose Serial I/O permits interfacing with a wide range of computers and peripheral devices.

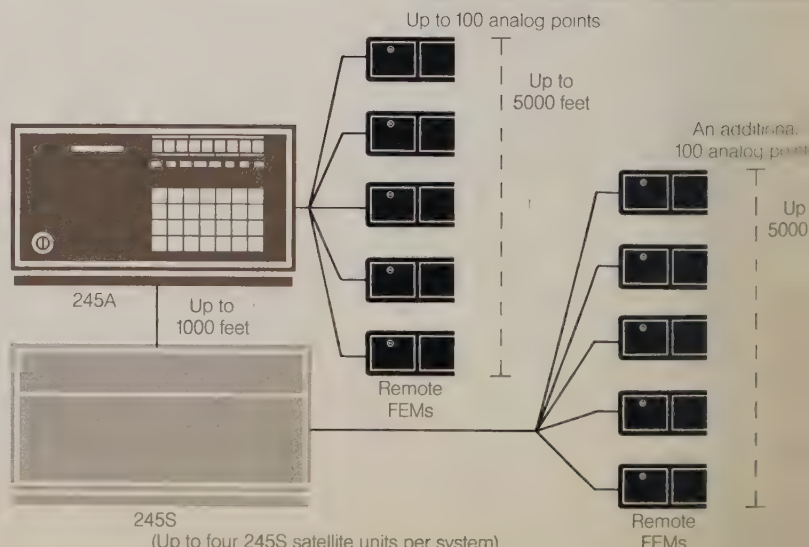
245S Satellite
Up to four per system
Up to 1000 feet from mainframe
Each handles up to five FEMs

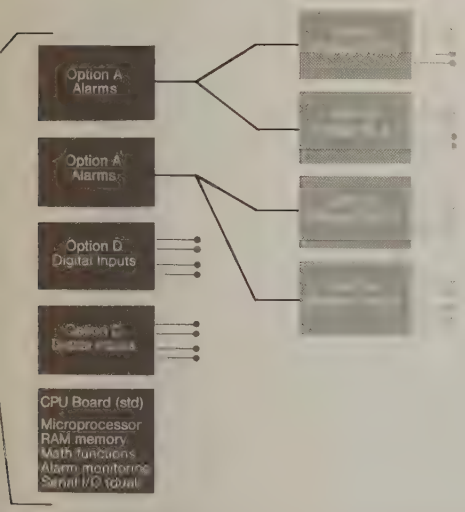
Just a few of the configuration possibilities available.




(Up to four 245S satellite units per system)
Up to 1000 feet
245A with FEMs inside
Up to 100 analog points
245S with FEMs inside
An additional 100 analog point







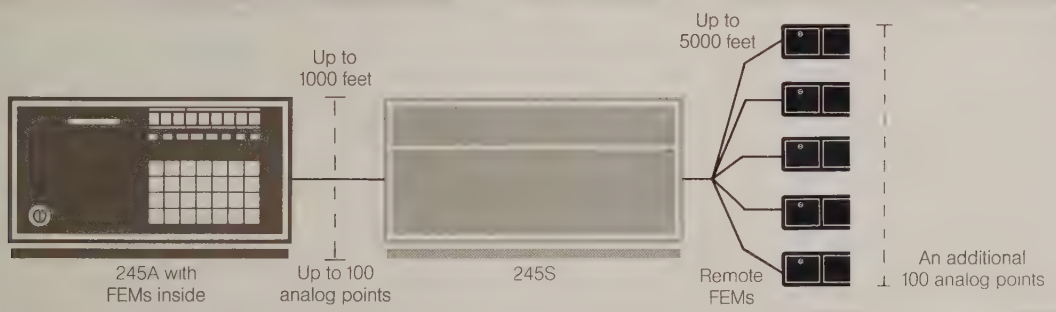
OPTIONS: Maximum of three plug-in cards per system.

Alarm Relay Driver Board, Option A
Drives up to 32 relays (i.e. two ARP1; see below)
Up to two per system

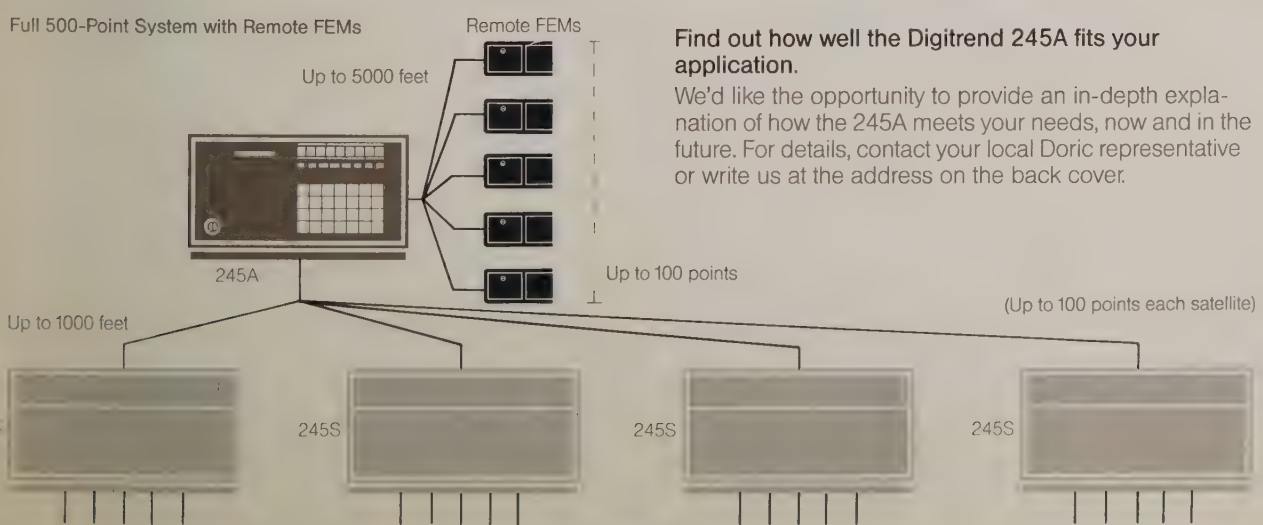
Alarm Relay Panel, Option ARP1
Up to four per system
Each handles 16 relays, 64 total for system

Digital Input Card, Option D
Up to two per system
Each handles 48 inputs, 96 total for system

Serial I/O (two ports standard) can communicate with a wide range of computers and peripheral devices such as terminals, cassette and cartridge recorders, and modems.



Full 500-Point System with Remote FEMs



Find out how well the Digitrend 245A fits your application.

We'd like the opportunity to provide an in-depth explanation of how the 245A meets your needs, now and in the future. For details, contact your local Doric representative or write us at the address on the back cover.

Digitrend 245 Specifications

Input Specifications

Measurement Technique: Dual-slope integrating, auto-zeroing, true differential input, analog to digital conversion; 16 bits; 65,000 count dynamic range.

Multiplexing Method: 20-point Front End Module (FEM); solid state (CMOS) or reed switching; five FEMs, max. per chassis (mainframe or satellite) (see table for detailed specifications).

Measurement Speed:

Points in system	Overall measurement speed
20	2.85 points/second
40	5.71 points/second
60	8.57 points/second
80	11.43 points/second
100	14.28 points/second
200	28.57 points/second
300	42.85 points/second
400	57.14 points/second
500	71.42 points/second

Analog Input Function Types: Thermocouple, RTD, volts, millivolts, milliamps, ohms; 42 Standard Functions (see table for detailed specifications).

Resolution: Switch selectable high or low sensitivities.
High: from 0.5μV to 1mV, 0.1°F or C
Low: from 1μV to 10mV, 1°F or C

Thermocouple Linearization Error (conformity): Less than 0.1°F for most ranges.

Linearization: Variable length second order polynomial segments.

Zero Stability: Patented switching amplifier front end reduces zero offset to ≤0.5μV.

A/D Reference: Monolithic precision reference. 20 ppm/°C temperature coefficient.

Gain Calibration: Software via programming controls (no potentiometer adjustments).

Output Specifications

Display: 7-segment, 0.5-inch LED.

Indicators: Individual red LED indicators for °F, °C, system alarm, point alarm, data/time, I/O error, power, program mode enabled.

Printer: Thermal alphanumeric, 12 columns, 5 x 7 dot matrix, 2.5 lines per second minimum, eight lines per inch, (3.1 lines/cm), 260 ft. (78m) roll or fanfold thermal paper.

Serial I/O Port (2 Standard): Programmable baud rate: 110, 300, 1200, 2400, 4800, 9600 baud.

RS-232-C voltage levels or 20 mA current loop (active or passive transmit and receive), field configurable, ASCII code.

Fully user programmable character format and protocol (bits/character; parity; stop bits; delay; full or half duplex, line and block control, header and trailer data, polled or unsolicited modes, etc.).

Alarm Relay Driver (Option A)

This is a circuit board that plugs into the 245A mainframe. It interfaces up to two Alarm Relay Panels allowing up to 32 relays to be controlled on an alarm condition. Up to two of these boards may be used for a total of 64 relays.

ALARM RELAY PANEL (Accessory ARP1): 16 relays per panel; form C; 115 VAC or 28 VDC, 2-Amp max., non-inductive load. Two alarm relay panels per alarm monitoring option card. Four panels max. per system with two Option A cards.

Alarm Annunciation Sequences: Standard ISA sequences selectable per alarm relay panel: Sequence A (formerly ISA-1)—flashing response to alarm until acknowledged; continuous response to alarm after acknowledge until alarm clears. Latching response; i.e. acknowledge must be provided to flashing response even if alarm condition clears.

Sequence A-4-5 (formerly ISA-1C)—continuous response to alarm; no latching (i.e. acknowledge not required to clear).

Digital Inputs (Option D)

Configuration: Switch selectable, parallel BCD, status, or sequential events (per card). Occupies one option slot, two cards max.

Inputs: DTL/TTL, logic level to 15V, contact closure.

Input Isolation: Optically isolated.

Input Protection: To 23V.

Parallel BCD Mode: 12 BCD digits per card, two each 6-character words, three each 4-character words, or six each 2-character words.

- **Input Code:** BCD 8421, bit parallel, positive or negative true (switch selectable).
- **Data Ready:** External transition loads data into storage.
- **Busy:** Inhibits data input during storage.
- **Hardwired Characters:** Minus sign, decimal point, A.B.C. blank. (One TTL load maximum, five volts.)

Status Mode:

- **Inputs:** 48 contact closures per card (inputs can be mixed, i.e., "open" and "closed").
- **Scan Rate:** 66.6 milliseconds.
- **Logging:** Program selected time intervals and/or upon change of status.

Sequential Events Recording (SER) Mode:

- **Inputs:** 48 contact closures per card (upon initialization all inputs must be of the same polarity).
- **Scan Rate:** Continuous.
- **Resolution:** One millisecond up to 10 events or 500 milliseconds, whichever occurs first. (2-millisecond resolution if two Option D cards set up in SER mode.)

Physical Specifications

Dimensions: (Bench Mount):

- **Mainframe and Satellite:** 8.63 in. (21.92cm) high x 14.00 in. (35.56cm) wide; mainframe depth 21.90 in. (55.62cm), satellite depth 21.15 in. (53.72cm).
- **Panel Mount** (Mainframe and Satellite)
  - **Cutout Dimensions:** 9.600 in. (24.38cm) high x 16.22 in. (41.2cm) wide.
  - **Bezel Outside Dimensions:** 10.5 (26.67cm) high x 17.25 in. (43.81cm) wide.
- **Rack Mount** (Mainframe and Satellite): EIA at 19.0 in. (48.26cm) x 10.4 in. (26.42cm) (48.3cm x 26.4cm).
- **Relay Panel:** Rack mount, 12.1 in. high x 19.0 in. wide x 4.0 in. deep (30.7cm x 48.3cm x 10.2cm).
- **FEM:** 12.88 in. (23.72cm) long x 6.44 in. (16.36cm) high x 1.38 in. (3.5cm) deep.

Specifications subject to change without notice.

Weight:

Mainframe or Satellite: 40 lbs. (18 kg) max.

Front End Module: 3.2 lbs. (1.4 kg) max.

Relay Panel: 8 lbs. (3.6 kg) max.

Temperature:

Operating: Mainframe and Satellite: 0 to 50°C.
Front End Modules: 0 to 70°C.

Storage: −20°C to 80°C.

Humidity:

Mainframe and Satellite: 90% RH non-condensing 0°C to 50°C.

Input Power:

Mainframe: 40 watts typical, 55 watts max.
100/130 VAC, 50/60 Hz
200/240 VAC, 50/60 Hz

Satellite: 40 watts typical, 55 watts max.
100/130 VAC, 50/60 Hz
200/240 VAC, 50/60 Hz

Alarm Relay Panel: 14 watts, max.
100/130 VAC, 50/60 Hz
200/240 VAC, 50/60 Hz, or 24 VDC ±5%.

AC: Same as mainframe, or 24 VDC ±5%.

Warm-up Time: Two minutes to full accuracy. Accuracy reduced by approximately 0.01% of range on initial turn-on.

Non-Volatile Memory: 30 days min. at 25°C; nickel-cadmium battery trickle charge.

Program Protection: Keylock standard.

Standard Functions

Function No.	Function	Range		Units	Resolution[1]
0	Raw Counts	0-65000		cts	1 count
1	10 mV	−9.9995	+9.9995	mV	0.5μV
2	20 mV	−10	+22	mV	1μV
3	80 mV	−40	+88	mV	2μV
4	400 mV	−200	+440	mV	10μV
5	2V	−1	+2.2	V	100μV
6	20V	−10	+22	V	1mV
7	Type B NBS Platinum-Rhodium	+543.8 +284.3	+3309.6 +1820.8	°F °C	0.1° 0.1°
8	Type E NBS Chromel-Constantan	−358.6 −217.0	+1836.5 +1002.5	°F °C	0.1° 0.1°
9	Type J NBS Iron-Constantan	−331.6 −202.0	+2195.0 +1201.6	°F °C	0.1° 0.1°
10	Type K NBS Chromel-Alumel	−327.4 −199.7	+2510.3 +1376.8	°F °C	0.1° 0.1°
11	Type R NBS Platinum-Rhodium	−72.3 −57.9	+3216.0 +1768.8	°F °C	0.1° 0.1°
12	Type S NBS Platinum-Rhodium	−67.1 −55.1	+3223.5 +1773.0	°F °C	0.1° 0.1°
13	Type T NBS Copper-Constantan	−372.2 −225.1	+753.7 +400.9	°F °C	0.1° 0.1°
14	Fe Con DIN Iron-Constantan	−314.5 −192.5	+1654.6 +901.4	°F °C	0.1° 0.1°
15	Cu Con DIN Copper-Constantan	−333.2 −202.9	+749.9 +398.8	°F °C	0.1° 0.1°
16	Reference Junction Temperature	+32 +0	+150 +65	°F °C	0.1° 0.1°
17	+4 to +20 mA	0	100	%	0.01%
18	Type B NBS	−10	+22	mV	1μV
19	Type E NBS	−40	+88	mV	2μV
20	Type J NBS	−40	+88	mV	2μV
21	Type K NBS	−40	+88	mV	2μV
22	Type R NBS	−10	+22	mV	1μV
23	Type S NBS	−10	+22	mV	1μV
24	Type T NBS	−10	+22	mV	1μV
25	Type J DIN	−40	+88	mV	2μV

Function No.	Function	Range		Units	Resolution[1]
26	Type T DIN	−10	+22	mV	1μV
27	$3PT_0D^2$	−358.12 −216.74	+655.34 +346.50	°F °C	.02° .01°
28	$4\ PT_0D^2$	−358.12 −216.74	+655.34 +346.50	°F °C	.02° .01°
29	$3\ PT_1D^2$	−360.76 −218.20	+999.98 +728.14	°F °C	.04° .02°
30	$4\ PT_1D^2$	−360.76 −218.20	+999.98 +728.14	°F °C	.04° .02°
31	$3\ PT_0N^2$	−351.54 −213.07	+643.02 +339.45	°F °C	.02° .01°
32	$4\ PT_0N^2$	−351.54 −213.07	+643.02 +339.45	°F °C	.02° .01°
33	$3PT_1N^2$	−354.24 −214.58	+999.98 +728.14	°F °C	.04° .02°
34	$4\ PT_1N^2$	−354.24 −214.58	+999.98 +728.14	°F °C	.04° .02°
35	3-Wire ohms	0	650	ohms	.01 ohm
36	4-Wire ohms	0	650	ohms	.01 ohm
37	Self-test (ground)	20879 ± 400 300 ± 50 (RTD)		cts	1 count
38	4 Cu (10 ohms)	−328 −200	+500 +260	°F °C	.2° .2°
39	3 Cu (10 ohms)	−328 −200	+500 +260	°F °C	.2° .2°
40	4 Ni (120 ohms)	−112 −80	+608 +320	°F °C	.1° .1°
41	3 Ni (120 ohms)	−112 −80	+608 +320	°F °C	.1° .1°

1. Resolution shown is for high sensitivity configuration.

2. X P Tx X
   - either N (α = 0.00392) or D (α = 0.00385)
   - range
   - Platinum 100-ohm ice point
   - either 3 or 4-wire RTD

Analog Front End Module (FEM)

FEM MULTIPLEXER TYPE	SOLID STATE VOLTAGE CMOS	UNIVERSAL VOLTAGE REED		CURRENT REED	SOLID STATE RTD [4,5,6] CMOS	REED RTD [4,5,6] REED
Number of Points per FEM	20	20		20	20	20
Common Mode Voltage Limits Input to Chassis Ground Point to Point (3 sec), High to Low (3 sec)	250 VAC RMS	250 VAC RMS		250 VAC RMS	250 VAC RMS	250 VAC RMS
CMV Limit for rated accuracy Input to Chassis Ground Point to Point	— 250 VAC RMS 6.5 volts peak	— 250 VAC RMS 200 volts peak		— 250 VAC RMS 200 volts peak	— 250 VAC RMS 6.5 volts peak	— 250 VAC RMS 200 volts peak
Offset Stability	Automatic Zero	Automatic Zero		Automatic Zero	Automatic Zero	Automatic Zero
Dynamic Range	65,000 counts	65,000 counts		65,000 counts	65,000 counts	65,000 counts
Overcurrent Protection	2.2 K ohms in series with each lead	2.2 K ohms in series with each lead		None	2.2 K ohms in series with each lead	2.2 K ohms in series with each lead
Poles per Switch	2	2		2	5	5
Power Consumption (typ)	1 watt	1 watt		1 watt	1 watt	1 watt
Quick Disconnect	No	Yes		No	Yes	Yes
FM Version Available	Pending	No		No	Pending	No
Cenelec Version Available	Pending	No		No	Pending	No
		—RANGE— 22mV, 88mV, 440mV, 2.2V	—RANGE— 22V			
Normal Mode Rejection 50/60 Hz ±0.1%	76/80 dB	76/80 dB	66/70 dB	76/80 dB	76/80 dB	76/80 dB
Effective CMR 50/60 Hz ±0.1% (1K ohm Lo Lead Unbalance)	126/130 dB	126/130 dB	116/120 dB	126/130 dB	126/130 dB[7]	126/130 dB[7]
Input Impedance[1]	>1000 M ohms	>1000 M ohms	10 M ohms	20 ohms	n/a	n/a
Point to Point Voltage Offset @ 25°C	<6μV	<10μV	<1 mV	<.5μa	.05°C	.05°C
Accuracy[2]: 24 hrs. @ 25°C 90 days @ 25°C 1 year @ 25°C	±(.005% Rdg + 3μV + 1 ct.) ±(.02% Rdg + 3μV + 1 ct.) ±(.035% Rdg + 6μV + 1 ct.)	±(.005% Rdg + 5μV + 1 ct.) ±(.02% Rdg + 5μV + 1 ct.) ±(.035% Rdg + 8μV + 1 ct.)	±(.01% Rdg + 500μV + 1 ct.) ±(.03% Rdg + 500μV + 1 ct.) ±(.055% Rdg + 800μV + 1 ct.)	±(.15% + .25μa + 1 ct.)[3] ±(.17% + .25μa + 1 ct.) ±(.185% + .4μA + 1 ct.)	±(.015% [Rdg + 300°C] + .025°C + 1 ct.) ±(.016% [Rdg + 300°C] + .025°C + 1 ct.) ±(.018% [Rdg + 300°C] + .05°C + 1 ct.)	±(.015% [Rdg + 300°C] + .025°C + 1 ct.) ±(.016% [Rdg + 300°C] + .025°C + 1 ct.) ±(.018% [Rdg + 300°C] + .05°C + 1 ct.)
Span Temperature Coefficient	±25 ppm/°C of Rdg	±25 ppm/°C of Rdg	±100 ppm/°C of Rdg	±50 ppm/°C of Rdg	±5 ppm/°C of Rdg	±5 ppm/°C of Rdg
Offset Temperature Stability (doubles every 10°C)	3μV/°C	3μV/°C	500μV/°C	.025μa/°C	.025°C/°C	.025°C/°C
Thermocouple Reference Junction	less than .01°/°	less than .01°/°	n/a	n/a	n/a	n/a

1. The allowable source resistance is limited by charging time required by the input filter. Charging error is <.001% of reading for a source resistance of 2 K ohms. Input impedance >10 meg Function 6. −10 +22V range.

2. Stated accuracy is achievable at reference condition using calibration equipment which adds no significant error. Factory calibration adds an error of ±(.05% Rdg +1μV + 1 ct.) to reference accuracy.

3. To convert error of I into display units of Percent (P) use: $P = (I \text{ in } -4)\ \frac{100\%}{16}$.

4. Errors are for 4-wire only. For 3-wire add 2.5°C per ohm lead unbalance and .005°C per ohm lead resistance. Double offset errors.

5. Error on ohms range is: ±(.05% Rdg +10 milliohms ±1 ct.).

6. Temperature equivalent measurements assume a platinum RTD input.

7. As measured with a worst case of 100 ohms unbalance between any leads in a 4-wire configuration. For 3-wire configuration see note 4.

Doric Scientific Division
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DORIC

August 1, 1984

DIGITREND® 245
DATA LOGGER ORDERING GUIDE/PRICE LIST

(Prices are U.S.A. list and subject to change without notice)

DIGITREND 245A MAINFRAME

PRICE

Mainframe includes two serial I/O ports, 0.1° resolution; °F/°-C switch selection, time of of day clock and day calendar, 42 analog input functions, math, alarm limits, 10 user jobs, accepts up to 4 satellites, full complement of front panel displays, keyboard, printer, one roll of paper, bench mount with power cord, operator and maintenance manuals.

~~1595.~~ 3795.00

DIGITREND 245A MAINFRAME MODEL NUMBERING SYSTEM

245A□ – □□–□□–□□–□□–□□ – □ – □ – □

- SYSTEM MAINFRAME
- ANALOG INPUTS
- OPTIONS AND INTERFACES

DIGITREND 245S SATELLITE

Satellite includes communications via 6 foot cable to interface 245A mainframe, housing for 5 FEMS, blank front panel with power on indicator, and power cord. 1995.

DIGITREND 245S SATELLITE MODEL NUMBERING SYSTEM

245S□ – □□–□□–□□–□□–□□

- SYSTEM SATELLITE
- ANALOG INPUTS

POWER CONNECTIONS (Mainframe or Satellite)

245▨□ –

(insert number code)

1	100-130VAC; 50/60Hz	N/C
2	200-260VAC; 50/60Hz	N/C
3	90-110VAC; 50/60Hz	N/C

ANALOG INPUTS

245▨▨ – □▨–□▨–□▨–□▨–□▨ –

FRONT END MODULE TYPE (insert up to five number codes.)

(Analog inputs to the Digitrend 245A and 245S are specified in groups of 20 points per Front End Module (FEM). Up to five FEM's per 245A or 245S may be specified in any combination .

1	SOLID STATE (CMOS) FEM - General purpose multiplexer for use with thermo-couples and millivolts.		995.ea.
3	RTD FEM (CMOS) - Special purpose multiplexer for use with RTD and resistance functions only.		995.ea.
4	4 to 20 mA (Reed) FEM - Special purpose multiplexers with signal conditioning built-in to accommodate this function only.		995.ea.
*6	INSTRINSICALLY SAFE SOLID STATE FEM	Use connection scheme J through R for FM approved	995.ea.
*7	INTRINSICALLY SAFE RTD FEM	Use connection scheme S through Z for Cenelec approved	995.ea
8	UNIVERSAL VOLTAGE (Reed) - General Purpose multiplexer for use with thermo-couples, millivolt and voltage inputs.		995.ea.
9	REED RTD - Special purpose multiplexer for use with RTD and resistance functions only		1195.ea

Complete the specification of analog input configuration by selecting the desired connection scheme for each FEM. Turn page.

* Available Spring of 1985

ANALOG INPUTS (CONTINUED)

245■■ – ■□ – ■□ – ■□ – ■□ – ■□

FEM CONNECTION SCHEMES (insert letter code for each FEM)

(For each FEM location specified, select the desired connection scheme. Each FEM may be installed directly in the 245A mainframe/245S satellite or remotely located and connected to the mainframe/satellite via a four wire FEM extension cable and FEM I/O extension card installed in the mainframe.

STANDARD CONNECTION

	DESCRIPTION	PRICE
A	FEM installed in mainframe/satellite	N/C
B	Remote FEM I/O card and connectors only	$195.ea.
C	Remote FEM I/O card and 10 foot extension cable	225.ea.
D	Remote FEM I/O card and 20 foot extension cable	235.ea.
E	Remote FEM I/O card and 50 foot extension cable	265.ea.
F	Remote FEM I/O card and 100 foot extension cable	315.ea.
G	Remote FEM I/O card and 200 foot extension cable	415.ea.
H	Remote FEM I/O card and custom length extension cable (Belden #8728 for less than 2000 ft., Belden #9184 for greater than 2000 ft., [613 meters])	245.ea +1.50/ft

NOTE: Mounting bracket for Remote FEM installation is offered as an accessory item (245A-0027) ordered separately.

INTRINSICALLY SAFE CONNECTIONS (Use only with FEM type 6 or 7)

FM APPROVED	CENELEC APPROVED	BOTH INCLUDE FEM EXTENSION CABLE	LETTER CODE	
J FEM I/O CARD	S FEM I/O CARD	10 foot	J or S	$525.ea.
K FEM I/O CARD	T FEM I/O CARD	20 foot	K or T	535.ea.
L FEM I/O CARD	U FEM I/O CARD	30 foot	L or U	565.ea.
M FEM I/O CARD	V FEM I/O CARD	100 foot	M or V	615.ea.
N FEM I/O CARD	W FEM I/O CARD	200 foot	N or W	715.ea.
P FEM I/O CARD	Y FEM I/O CARD	custom length (Belden #8728, 1500 feet [460] meters maximum)	P or Y	545.ea. +1.50/ft.
R FEM I/O CARD	Z FEM I/O CARD	connectors only	R or Z	495.ea.

SYSTEM OPTIONS AND INTERFACES

(Option slots are provided in the Digitrend 245A only to accommodate up to three system options)

245A■ – ■■ – ■■ – ■■ – ■■ – ■■ – □ – □ – □

OPTIONS AND INTERFACES (enter letter codes)

A **ALARM RELAY PANEL INTERFACE.** Supports up to two Alarm Relay Panels (245A-ARP1). To support three or four Alarm Relay Panels, option A must be included twice. — 695.

D **DIGITAL INPUTS.** 48 digital inputs grouped as BCD digits or treated individually as status or sequence of events input. (User configured). Maximum of two option D per instrument. — 1,000.

DIGITREND 245
ACCESSORIES, ADD-ONS, SPARE PARTS AND SERVICES

ACCESSORIES

	ITEM CODE	PRICE
ALARM RELAY PANEL Rack mount (19"W x 12"H x 4"D [48.26cm x 30.48 x 10.16cm]); includes 10 foot interface cable to 245A mainframe option A 110/220VAC; 24 VDC (specify power required).	245A-ARP1	$600.ea.
INPUT ATTENUATOR, 1000: 1 voltage attenuator, 6 inputs with individual ratio adjustment	245A-ATEN	180. ea.
SHIPPING CONTAINER, reusable, removable casters, 13.4" (34cm) x 27.0" (68.6cm) x 21.0" (53.3cm); approx. 19 lbs (8.6kg)	245A-CASE	495. ea.
REMOTE START CABLE, 6 ft. user end open ended	245A-RMST	35. ea.
REMOTE FEM MOUNTING BRACKET	245A-0027	50. ea.
RACK MOUNTING KIT (Mainframe or Satellite) Adapts unit to EIA 19" rack (19" x 10.5" [48.26cm x 26.67cm]).	245A-00W6	125. ea.
PANEL MOUNTING KIT (Mainframe or Satellite) Panel Cutout dimensions (9.60" x 16.20" [24.38cm x 41.15cm]).	245A-00W1	75. ea.

ACCESSORIES (CONTINUED)

	ITEM CODE	PRICE
STAINLESS STEEL TAGS, unmounted, 2.88"[7.32cm]H x 1.75" [4.45cm]L, 20 GA, Type 301. Specify inscription: 6 lines max.; 20 characters, max. per line	245A-0066	35. ea.
NEMA 4 FEM ENCLOSURE For up to five FEMs, 20 " (51 cm) x 24" (61 cm) x 9.3" (24 cm). Requires accessory 245A-0027 for each FEM.	245A-0065	1,150. ea.
RS232C/IEEE-488 ADAPTER, manufactured by ICS Electronics Corp. This stand-alone box allows the user to communicate with his 245 over the IEEE-488 bus. Many option selections allow buffered interface to the 245 over a 6 ft. cable.	245A-☐BUS	1,250 ea.
RACK MOUNT IEEE-488 ADAPTER, same as the 245A-BUS with addition of ICS, Inc. Model 4834-11 rack mounting kit.	245A-☐BUSR	1,350.ea.

Insert Power Code
1 = 115±10%VAC, 60 Hz
2 = 230±10%VAC, 60 Hz
3 = 115±10%VAC, 50 Hz
4 = 230±10%VAC, 50 Hz

ROLL PAPER, CASE, 30 rolls, 250 ft. (76m).	245A-PPR1	75. case
FANFOLD PAPER ATTACHMENT, metal	245A-0030	35. ea.
FANFOLD PAPER, CASE, 25 packets,250 ft. (76m).	245A-PPR2	110. case

PERIPHERALS

Consult factory for information regarding adaptability and availability of peripherals. We can provide video display terminals, cassette recorders, tape drives, personal computers, printers, etc.

SATELLITE CABLES

Cable 245A to 245S (Specify length, 1000 ft. max.)	245S-CABL	50.ea. +1.50/ft.

SERIAL I/O CABLES

Standard interface cables for use with either Serial I/O Port. All cables are 6 ft. in length.

RS232C, 245 (male) to terminal (male)	245A-0040	65. ea.
245 (male) to modem (female)	245A-0041	
245 (male) to terminal (female)	245A-0043	
245 (male) to IEEE-488 adapter	245A-0046	
20mA CURRENT LOOP, 245 (male) to TTY (Spade lugs)	245A-0042	
245 (male) to ADM-3A (male)	245A-0044	

MANUALS

OPERATOR'S MANUAL, (Extra, one supplied w/instrument)	245A-HBK1	35. ea.
SERVICE MANUAL, (Extra, one supplied w/instrument)	245A-HBK2	75. ea.

OUTLINE DIMENSION DRAWINGS

Blueprint copies.

245 Mainframe or Satellite, bench mount	245A-DRBA	15. 1st
panel mounting (245A-00W1 installation and cutout)	245A-DRBB	5. ea. addit'l
rack mounting (245A-00W6 installation)	245A-DRBC	
ATTENUATOR installation and dimensions	245A-DRBH	
Alarm relay panel (245A-ARP1)	245A-DRBD	
Remote FEM mounting (245A-0027)	245A-DRBE	
NEMA 4 FEM Housing (245A-0065)	245A-DRBF	
Reproducible sepia of any of the above order:	245A-DRS☐	25. 1st 15. ea. addit'l
Certified copies of any of the above order:	245A-DCB☐	25. 1st 15. ea. addit'l
Certified, reproducible of any of the above, order:	245A-DCS☐	35. 1st 25. ea. addit'l

SERVICES

Start-Up Assistance, a Doric field service engineer will travel to your site to inspect and verify your completed installation and will train your operators and/or supervisors in the unit's operation. Charges include all travel and expenses.	1 day	245A-SA01	$2,000.
	2 days	245A-SA02	2695.
	3 days	245A-SA03	3390
	4 days	245A-SA04	4085
	5 days	245A-SA05	4780.

FACTORY CHECKOUT SERVICES

	ITEM CODE	PRICE
Customer witnessed factory acceptance tests	245A-FACT	350. /day
Factory checkout with customer furnished peripheral	245A-OCFP	350. min.
Factory checkout with Doric supplied peripheral	245A-OSTF	200. min.

ADD-ONS

Front End Modules		
Solid state multiplexer	245A-FEM1	995.ea.
RTD (Solid State) multiplexer	245A-FEM3	995.ea.
4 to 20 mA (Reed) multiplexer	245A-FEM4	995.ea.
Universal Voltage (Reed)	245A-FEM8	995.ea.
Reed RTD	245A-FEM9	1,195.ea.
* **Intrinsically Safe FEMS**		
Solid State Multiplexer	245A-ISFEM6	995.ea.
RTD (Solid State) Multiplexer	245A-ISFEM7	995.ea.
Remote FEM I/O Card (order cable and connector assemblies separately.)	245A-0024	195.ea.
FM Intrinsically Safe Remote FEM I/O Card (order cable and connector assemblies separately.)	245A-IS24	195.ea.
Intrinsicaly Safe Cenelec Approved Remote FEM I/O Card (order cable and connector assemblies separately.)	245A-CA24	195.ea.

FEM CABLES AND CONNECTORS

FEM Extension Cable Assemblies, (includes connectors)

10 feet	245A CBLC	100. ea.
20 feet	245A-CBLD	110. ea.
50 feet	245A-CBLE	145. ea.
100 feet	245A-CBLF	205. ea.
200 feet	245A-CBLG	325. ea.
Specify length	245A-CBLH	100. ea. +1.50/ft.

FM Approved FEM Extension Cable Assemblies, (includes connectors)

10 feet	245A-CBLJ	100. ea.
20 feet	245A-CBLK	110. ea.
50 feet	245A-CBLL	145. ea.
100 feet	245A-CBLM	205. ea.
200 feet	245A-CBLN	325. ea.
Specify length	245A-CBLP	100. ea. +1.50/ft.

Cenelec Approved FEM Extension Cable Assemblies, (includes connectors)

10 feet	245A-CBLS	100.ea.
20 feet	245A-CBLT	110.ea.
50 feet	245A-CBLU	145.ea.
100 feet	245A-CBLV	205.ea.
200 feet	245A-CBLW	325.ea.
Specify length	245A-CBLY	100.ea. +1.50/ft.

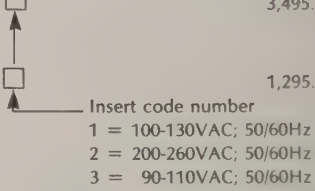
FEM Extension Cable, specify length (order connector kit separately) for less than 2000', Belden 8728, for greater than 2000', Belden 9184.	245A-CBLX	50. ea. +1.50/ft.
Remote FEM Connector Assembly Kit	245A-0026	60. set
Remote FEM Connector Assembly Kit for FM Intrinsic Safety requirements	245A-IS26	60. set
Remote FEM Connector Assembly Kit for Cenelec Intrinsic Safety requirements	245A-CA26	60.set

OPTIONS

Alarm Relay Panel Interface	245A-OPTA	795.
Digital Inputs	245A-OPTD	1,200.

SPARE PARTS

Basic Mainframe Spare Parts Kit. Includes power supply, CPU and display assemblies; 1 thermal print head, fuses and additional miscellaneous spare parts.	245A-KIT ☐	3,495.
Basic Satellite Spare Parts Kit. Includes power supply, CPU, fuses and addition miscellaneous spare parts.	245S-KIT ☐	1,295.



(A discount of 15% will be applied whenever the spare parts kit (245A/245S-KIT ☐) is purchased on the same order with any 245A mainframe or 245S satellite.)

NOTE: Use ADD-ON prices when ordering spare option, interface or FEM assemblies.

* Available Spring of 1985

DORIC SCIENTIFIC
3883 Ruffin Rd , San Diego, CA 92123
In CA call (619) 565-4415
Toll Free (800) 854-2708, Telex 249031
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when a little difference makes a big difference

DORIC

Effective March 1987

TRENDICATOR® II DIGITAL BENCH TOP INDICATORS
Ordering Guide/Price List

Model	Base Instrument	Price
700A	Standard resolution: 1.0° F/C, 10.0μV, 0.1%, to 9999 counts, up to 5 options per instrument.	$549.00
710A	High resolution: 0.1° F/C, 1.0μV, 0.01%, to 99999 counts, up to 5 options per instrument.	649.00

Code	AC Line Voltage (select one)	
1	90 to 130 VAC, 48 to 400 Hz	N/C
2	190 to 262 VAC, 48 to 400 Hz	N/C

Code	Input Range Selection (select one input range per instrument)	
T	T/C ranges: J, K, T, E ,R ,S ,B, N, C, G, D, CGI, FeCon (DIN), CuCon (DIN)	N/C
V	VDC ranges: –15 to 100mV, –150 to 1000mV, –1.5 to 10V and –15 to 100V	N/C
C	Current ranges: 4-20 mA and 10-50mA = 0 to 100%	N/C
R	RTD ranges (3 or 4 wire): Pt100/200/1000, Cu10, Ni120	N/C
Y	Thermistor ranges: YSI 400, 2-wire and YSI 700, 3 wire	N/C

Code	Multipoint input switching options (select one type per instrument)	
206	6 inputs of 2 wire sensors (1 card, counts as 1 option type)	129.00
212	12 inputs of 2 wire sensors (2 cards, counts as 2 option types)	258.00
218	18 inputs of 2 wire sensors (3 cards, counts as 3 option types)	387.00
224	24 inputs of 2 wire sensors (4 cards, counts as 4 option types)	516.00
403	3 inputs of 3/4 wire sensors (1 card, counts as 1 option types)	149.00
406	6 inputs of 3/4 wire sensors (2 cards, counts as 2 option types)	298.00
409	9 inputs of 3/4 wire sensors (3 cards, counts as 3 option types)	447.00
412	12 inputs of 3/4 wire sensors (4 cards, counts as 4 option types)	596.00
2DI	Delta input, 2 wire sensors (1 card, counts as 1 option type)	129.00
4DI	Delta input, 3/4 wire sensors (1 card, counts as 1 option type)	129.00

*Delta input cannot be mixed with other input switching options

Code	Other Options (one type per instrument except as noted)	
DC1	DC POWER: isolated instrument power (9-16 VDC) } mutually exclusive	129.00
DC2	DC POWER: isolated instrument power (18-32 VDC) } mutually exclusive	129.00
MTH	MATH: maximum, minimum, average, rate of change	99.00
SCL	SCALING AND OFFSET: user configurable	99.00
ALM	ALARMS: dual limits, selectable delay, up to 2 per instrument	169.00
AOV	ANALOG OUTPUT, VOLTAGE: 0-10 VDC, scalable } mutually exclusive	169.00
AOC	ANALOG OUTPUT, CURRENT: 4-20mA, scalable } mutually exclusive	169.00
SER	SERIAL OUTPUT: RS232 or current loop	249.00
BCD	BCD OUTPUT: Tri-state, isolated BCD	169.00

EXAMPLE

710A 1 T – 212 – MTH – AOC	Model 710A, 90 to 130 VAC AC line power, for thermocouples with options installed for 12 inputs, 4-20mA analog output, and math.

OPTIONS AND ACCESSORIES

Model/Code	Add-On's and Accessories	Price
700A-HBK1	Extra owners manual (all models) one included with unit	10.00
700A-HBK2	Service manual (all models)	50.00
700A-CONS	DB25 connector for serial output option	15.00

Model/Code	Input Range Cards (Add-on or Spares)	
700A-TINP	Thermocouple range card	129.00
700A-VINP	Volts/millvolts range card	129.00
700A-CINP	Current range card	129.00
700A-RINP	RTD range card	149.00
700A-YINP	Thermistor range card	129.00

Model/Code	Option Cards (Add-on or Spares)	
700A-DC12	12 VDC isolated instrument power (9-16 VDC)	129.00
700A-DC24	24 VDC isolated instrument power (18-32 VDC)	129.00
700A-MTHO	Math, maximum, minimum, rate of change	99.00
700A-SCLO	Scaling and offset, user configurable	99.00
700A-ALMO	Alarms, dual limits, selectable delay (up to 2 per instrument)	169.00
700A-AOVO	Analog output, voltage 0-10 VDC, scalable	169.00
700A-AOCO	Analog output, current 4-20 mA, scalable	169.00
700A-SERO	Serial output option, RS232 or current loop	249.00
700A-BCDO	BCD Output option, isolated tri-state	169.00

Model/Code	Multipoint Input Switching cards (see order guide for allowed configuration)	
700A-2WMP	2 wire, multipoint input switching card. Switches 6 inputs	129.00
700A-4WMP	3/4 wire, multipoint input switching card, Switches 3 inputs	149.00
700A-2WD1	2 wire, Delta input switch card, point 1, 2 or 1-2 (includes label/keypad set)	129.00
700A-4WD1	4 wire, Delta input switch card, point 1, 2 or 1-2 (includes label/keypad set)	129.00

Model/Code	Multipoint Label/Keypad Sets	
700A-L206	Points 1-6 (2 wire inputs)	10.00
700A-L212	Points 1-12 (2 wire inputs)	10.00
700A-L218	Points 1-18 (2 wire inputs)	10.00
700A-L224	Points 1-24 (2 wire inputs)	10.00
700A-L403	Points 1-3 (3/4 wire inputs)	10.00
700A-L406	Points 1-6 (3/4 wire inputs)	10.00
700A-L409	Points 1-9 (3/4 wire inputs)	10.00
700A-L412	Points 1-12 (3/4 wire inputs)	10.00

Prices and Specifications subject to change without notice.

DORIC

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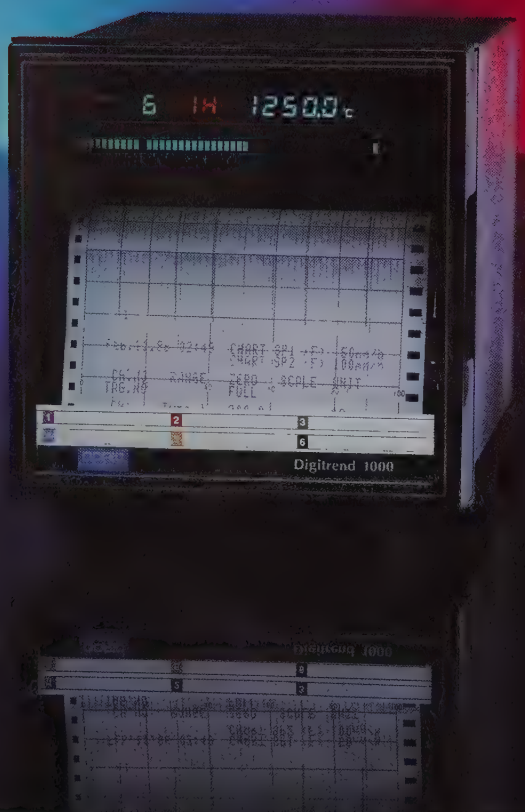
700/3-87/5M/RP

DORIC

DORIC DIGITREND® 1000

100mm Hybrid Recorder
Fully Programmable



- Maximum flexibility in a compact unit–depth only 9.125".
- Six points individually range programmable.
- Your choice: thermocouple, RTD, or user scalable DC Voltage ranges.
- Quick-reading analog (bar graph) and digital monitoring display.
- Easy-reading illuminated chart with analog and digital printing.
- Six color traces with easy snap-in ribbon cartridge.
- Simple keypad selection of input types, full-scale ranges, alarms and chart speeds.
- Up to four relayed alarms per input point.
- Differential temperature function.
- Remote chart speed, stop/start.

YOUR REQUIREMENTS

The DR1000 Idea.

The design idea behind the Digitrend ®1000 is maximum functionality in a small package -- only 144mmH X 144mmW X 230mmD (5.6875" X 5.6875" X 9.125").

Will it be easy to use?

Yes! A simple side panel keypad allows you to assign individual channel ranges, alarms, scale engineering units, assign chart message tags, change chart speeds in 1mm/hour increments and skip points.

Multi-input applications.

Your continuous trending application may be in petrochemical processing, steel manufacturing, heat treating or furnace testing. Or, use it for process verification, pilot plant monitoring or an environmental chamber in a research and development lab. Whatever your application, the Digitrend 1000 will accurately measure, display and record up to six direct sensor inputs in color.

Changing ranges.

When you change thermocouples, for instance, simply select a new range from your choice of nine full-scale thermocouple ranges, using the easy side panel keypad. You can assign any range to any individual point or group of points. An RTD version is also available. And for d.c. voltage inputs, ranges are available for direct reading of the signal or you can scale the display values in the engineering units of your choice.

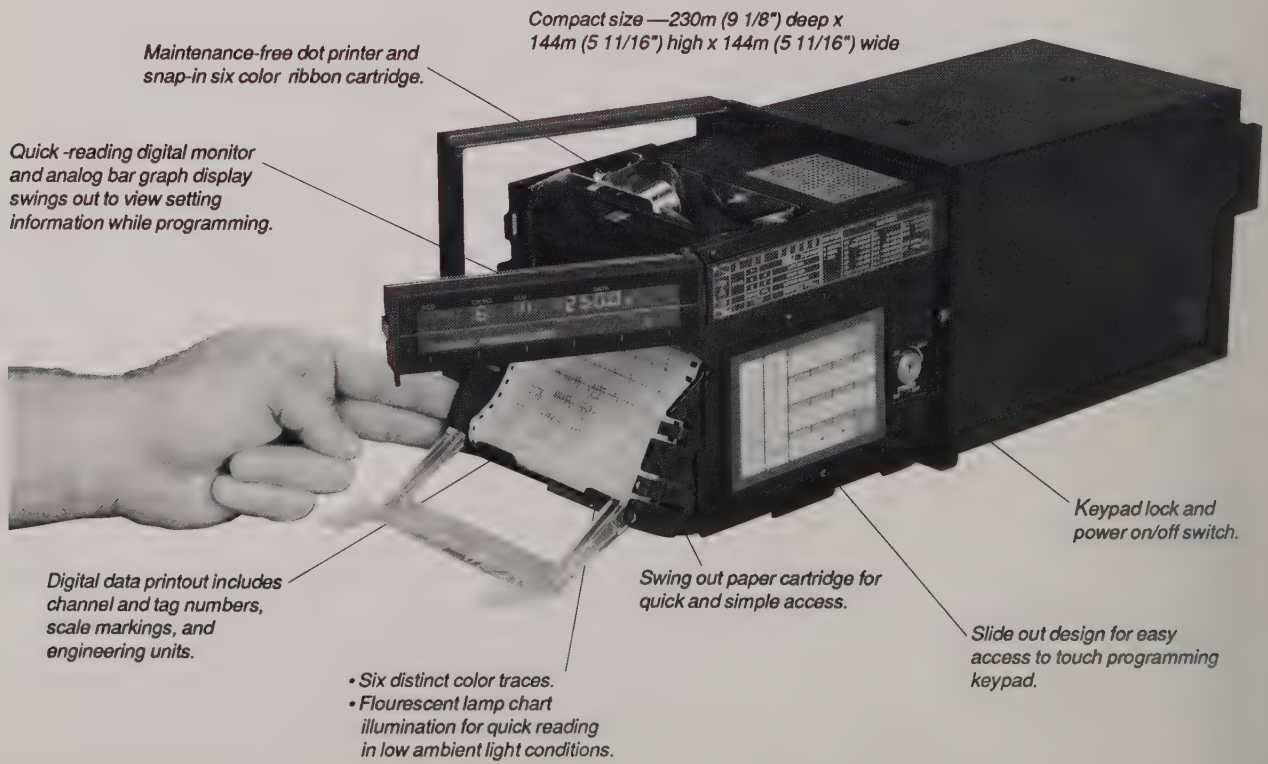
Information the way you want it.

An easy to read display shows you data in analog form, via bar graph, and in digital form. The chart records analog point traces in six colors as well as printing digital tags, units, and scale markings. Chart speed and start/stop are programmable from the keypad or control- led by remote contact closure.

No matter what your ambient light is like, the flourescent-lit chart is always easy to read. So is the flourescent-backlit LCD display.

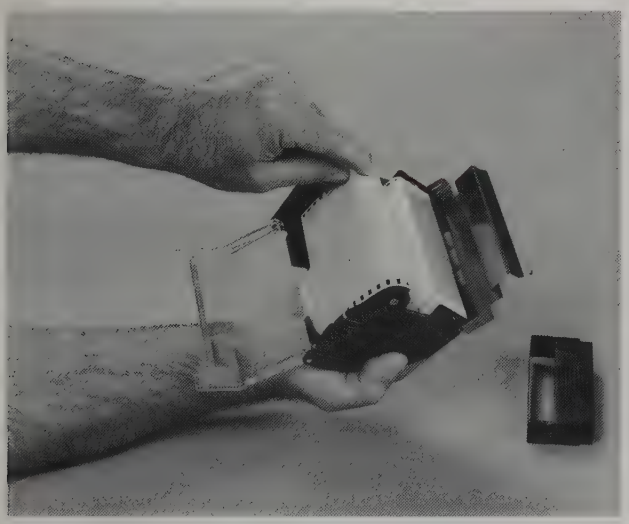
If you wish to scale a voltage input like PSI, inches, RPM or any other units you choose, the key-lockable side panel keypad makes it easy.

You can also display and record a differential temperature value between a reference point and one or more other points. Even skip points if you like.


Compact size —230m (9 1/8") deep x 144m (5 11/16") high x 144m (5 11/16") wide
Maintenance-free dot printer and snap-in six color ribbon cartridge.
Quick -reading digital monitor and analog bar graph display swings out to view setting information while programming.
Keypad lock and power on/off switch.
Digital data printout includes channel and tag numbers, scale markings, and engineering units.
Swing out paper cartridge for quick and simple access.
Slide out design for easy access to touch programming keypad.
• Six distinct color traces.
• Flourescent lamp chart illumination for quick reading in low ambient light conditions.

No more mess.

Other recorders require messy pens or capillary systems to get the job done. Routine replacement can be a frustrating interruption. The Digitrend 1000 uses a clean, clear dot matrix print head and one snap-in six-color ribbon cartridge which eliminate the mess and reduce downtime.



•Paper cartridge opens for easy loading of fan-fold chart.
•Six-color ribbon cassette is self-contained and disposable.

Convenient review.

If you want to review chart information, the drop-in fanfold paper cartridge simplifies your job even further. Maximum history, stored in minimum space, is available at your fingertips. And changing paper is simple and easy.

Reliability you can trust.

A microprocessor handles analog to digital conversions, stores ranges, performs data manipulations and reduces discrete circuit and interconnect failures. Ink clogging and dried-out capillaries are eliminated by the dot matrix print mechanism and ribbon cartridge. And if you ever lose power, battery-backed memory retains all your operating parameters.

What about accuracy?

All six points are updated every five seconds with display accuracy to ±0.1% of reading +2 digits. Recording accuracy is ±0.5% of span on the 2 Volt d.c. range.

How to order.

Thousands of customers have chosen Doric since 1967. They enjoy the accuracy, repeatability and reliability built into each of our instruments. We are confident you will choose Doric for the same reasons.

Call us toll free for the sales office nearest you, or to answer any questions you may have. Call **800/854-2708**. In California, call **800/227-9781** or (619) 565-4415.

Functions of the Digitrend 1000

Standard Function	Description
Full-scale range setting	Programmable via keyboard for each point.
Skip	Skips selected points.
Program list printout	Contents of program memory are listed on the chart.
Digital printout	Channel & tag numbers, scale mark-markings, chart speed, date and time are printed at regular intervals on left side of chart.
Digital display	Channel number, alarm, measured data, date & time, or setting values are displayed.
Bar graph (analog) display	Measured data and alarm set points are displayed.

Standard Function	Description
ΔT measurement	Analog printout of temperature difference between the reference and any other point.
Scaling	Scaling for voltage input ranges of 5 mV span to 50V (–19999 to 20000, 30000 span).
Battery-backup memory	Three 1.5V batteries retain all programming when power is removed.
Optional Function	
Alarm Relays and Remote control	Up to four relayed alarm outputs per point (common). Remote chart speed start/stop.

SPECIFICATIONS

Number of Inputs: 6 point dot printing
Input Signal Levels:
d.c. Volts: 5 mV span to 50 V
Thermocouple: >100°C (3 mV)
RTD: >50°C span (Pt 100Ω)
Full Scale Range Setting: Programmable via keyboard
Measuring Ranges: Thermocouple: ANSI & DIN models; RTD: RTD: DIN models

Input Type	Range Code	Measuring Range	
d.c. V	00	–20.00 to 20.00mV	
	01	–200.0 to 200.0mV	
	02	–2.000 to 2.000V	
	03	–6.000 to 6.000V	
	04	–20.00 to 20.00V	
	05	–50.00 to 50.00V	
Thermocouple ANSI °C/°F			
R	10	0 to 1760°C	32 to 3200°F
S	11	0 to 1760°C	32 to 3200°F
B	12	400.0 to 1820.0°C	752 to 3308°F
K	13	–200.0 to 1370.0°C	–328 to 2498°F
E	14	–200.0 to 800.0°C	–328.0 to 1478.0°F
J	15	–200.0 to 1100.0°C	–328.0 to 2012.0°F
T	16	–200.0 to 400.0°C	–328.0 to 752.0°F
N*	17	0 to 1300°C	32 to 2372°F
W*	18	0 to 2315°C	32 to 4200°F
RTD			
Pt 100Ω	20	–200.0 to 550.0°C	–328 to 1022°F
d.c. voltage (linear scaling)	30	–20.00 to 20.00mV	
	31	–200.0 to 200.0mV	
	32	–2.000 to 2.000V	
**mA	33	–6.000 to 6.000V (1 to 5V, 4-20mA)	
	34	–20.00 to 20.00V	
	35	–50.00 to 50.00V	

DIN (°C) Model

Input Type	Range Code	Measuring Range
Thermocouple (DIN)		
R	10	0 to 1760°C
PtRh-Pt	11	0 to 1760°C
B	12	400.0 to 1820.0°C
NiCr-Ni	13	–200.0 to 1370.0°C
E	14	–200.0 to 800.0°C
Fe-CuNi	15	–200.0 to 900.0°C
Cu-CuNi	16	–200.0 to 400.0°C
N*	17	0 to 1300°C
W*	18	0 to 2315°C

*Type N(Nicrosil-Nisil), Type W(W5% Re-W26% Re) are not ANSI or DIN standards.
** DR1000 can accept a current when shunt resistance is used.

Digital Data Printout: Channel number, tag number, scale markings (at 0 & 100% of chart with engineering unit), chart speed, date and time.
Program List Printout: Date and time, measuring range, tag number, engineering unit, alarms, chart speed.
Maximum Input Voltage (Continuous): 10V d.c. for ranges of less than 2V d.c., 100V d.c. for ranges of 6 to 50V d.c..
Writing System: Wire-dot printer and six-color ribbon.
Effective Recording Span: 100mm (analog data).
Scan Cycle Time (or Rate): 5 seconds/6 points.
Print Cycle Time: 5 seconds/point.
Chart: Z-fold chart (114mm x 16m) with a calibrated width of 100 mm
Chart Speeds: 5 - 1,500 mm/hr (selectable in 1mm steps via keyboard).

Recording Colors: 1st point-purple, 2nd point-red, 3rd point-green, 4th point-blue, 5th point-brown, 6th point-black.
Alarm Printout: Channel number, H or L sign, and the time of alarm on/off.
Type of Display: LCD (flourscent back-lit).
Digital Data Display: Measured data (d.c.V is 3 1/2 digits; temperature: 0.1°C), alarm (high or low sign), channel number, date and time, chart speed, low battery indication.
Bar Graph Display: Measured data, alarm set points, alarm condition (2% resolution)
Measured (Display) Accuracy: ±(0.1% of reading + 2 digits) on 2V d.c. range.
Recording Accuracy: ±0.5% of span on 2V d.c. range.
Dead Band: Less than 0.2% of recording span.
Input Impedance: At least 10MΩ on these ranges: 20, 200 mV, 2Vd.c.. Approximately 1MΩ 6, 20, and 50V d.c. ranges.
External Resistance: DC V or TC input: <2kΩ; RTD input: <10Ω/wire.
Dielectric Strength: 1,500V a.c. for one minute between power line and case, or 500V a.c. for one minute between input terminals (except for RTD input), or between input terminals and case.
Mounting: Flush panel mounting (May be inclined up to 30° from vertical.
Case: Drawn steel with gasketed, dust-tight door.
Finish: Black case, semi-gloss black door.
Internal Illumination: Fluorescent lamp.
Dimensions: Approximately 5 11/16 x 5 11/16 x 9 1/8 in. (144 x 144 x 230 mm).
Weight: approximately 9.3 lbs. (4.2kg.)
Power Requirements: 115, 230V a.c., 50 or 60 Hz (must specify).
Power Consumption: approximately 20 VA.
Ambient Temperature: 5 to 40°C (41 to 104°F).
Humidity: 45% to 85% relative humidity, non-condensing.
Numbers of Alarm Set Points: Up to 4 set points (H or L) via keyboard.
Alarm Display: ALM (H or L) lights up on alarm (bar graph, alarm set point display).
Hysteresis: Approximately 0.5% of span.

Model	
1000	6 CHANNEL RECORDER including owners manual, z-fold chart paper, 6-color ribbon cartridge, door strip, fuse and batteries; °F and °C switchable.

Code	Power Supply
1	115 V a.c. 60 Hz power supply
2	230 V a.c. 50 Hz power supply

Code	Input
1	Thermocouple/d.c. V (ANSI) input, °F and °C
2	RTD α .00385 (DIN) input, °F and °C
3	Thermocouple/d.c. V (DIN) input, °F and °C

Code	Options
0	No options
1	Alarm output and remote chart speed, start, stop

EXAMPLE

1000	– 1	1	0	Model DR1000, 6 channel recorder 115 Va.c., TC/d.c. V programmable input (ANSI)

Model/Code	Accessories Sold Separately
1000–HBK1	Extra owners manual.
1000–CHRT	Extra z-fold chart paper (114mm x 16m)
1000–RIBN	6 color ribbon cartridge
1000-CORD	Power cord, 115V, 6 feet long (1.8mm)

Your nearest representative:

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PO Box 363, Arbachstrasse 2
CH-6340 Baar-Inwil
SWITZERLAND
Tel: (41)(42) 33-37-77
Telex: (845) 8868923

2-87/10M/AC

DORIC

DORIC DC7000

Digital Single Loop Temperature Controller

- Automatic tuning
- PID control modes
- Inputs: thermocouple, RTD, mV, mA
- Outputs: relay, 4 - 20 mA, SSR
- Remote or local setpoint input
- HI and LO deviation alarms
- Bar graph LED output display
- Open input protection
- Output limiter
- Bumpless - balanceless transfer
- Self test
- Continuous self-calibration

Control with accuracy, flexibility and ease

OPTIMUM CONTROL WITH AUTOMATIC TUNING

Doric's DC7000 is a microprocessor-based temperature controller that provides high-performance digital process control the very first day you use it. On demand, an automatic tuning feature analyzes the thermal response of your process and sets the optimum PID tuning parameters for you. All you do is enter the process setpoint. When the controller reaches the setpoint, it goes through a programmed sequence from which it 'learns' how to control your process. No more trial and error. You get optimized control the first time around.

It is easy to get started controlling your process using the DC7000 controller. Besides the built-in help from automatic tuning which sets the PID parameters, you can limit the controller output anywhere from 0-100%. And if you want to try your own tuning parameters, you can override the automatic tuning values. Switching between automatic and manual control is accomplished with bumpless-balanceless transfer. With flexibility like this, the DC7000 zeroes in on optimum process control in record time for most any application.

INPUTS AND OUTPUTS TO MATCH YOUR PROCESS

The series DC7000 ¼ DIN controllers offer a variety of input and output options. The inputs can be thermocouples, RTD's, 4-20 mA or millivolts. Within each input group, you select the specific type of thermocouple, RTD, or millivolt range just by setting a switch. The outputs available are time-proportional on-off relay, time-proportional on-off voltage for SSR drive and continuous 4-20 mA.

EASY TO READ DISPLAYS

And it is easy to see the controller action at any time. The output indicator gives a bar graph display of the magnitude and duration of the controller output. The process variable may be continuously displayed to four digits, or you may display the process setpoint, the percent output, or the deviation alarm limits. The control indicator displays a steady green light when the process is controlled within $\pm 0.5\%$ of setpoint. If the process exceeds either the high or low deviation alarm limit, a red arrow on either side of the control indicator lights up.

TRUST YOUR PROCESS TO US

Your process is safe with the DC7000. First priority is accuracy. The controller continuously calibrates itself for zero and span to maintain exceptional control accuracy around the setpoint. In addition, there is a self test function that continuously checks the microprocessor. Exceeding a high or low deviation alarm triggers an alarm relay output. Your process is protected from overheating should a thermocouple open; the controller automatically sets the output to zero to protect the material in process and the process equipment.

TIE YOUR PROCESSES TOGETHER

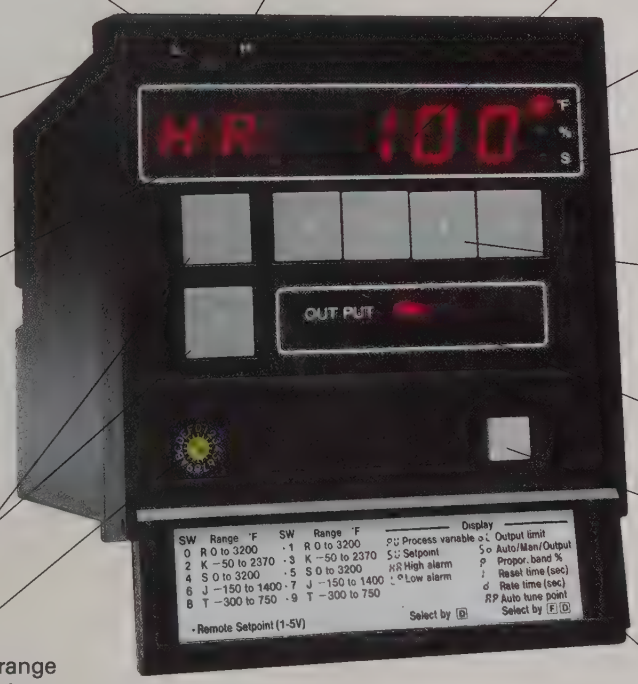
You can tie the DC7000 to other processes or direct a heating sequence from a remote control device. The controller can receive an analog setpoint signal of 1-5 VDC from a remote source such as a setpoint programmer or computer. The remote input is scaled to the selected range and may be displayed on the front panel.

POWER FAILURE — NO PROBLEM

All your vital control parameters — setpoint, alarm limits, PID settings, output limit — are safely stored in memory with battery backup for more than five years. The controller will not need resetting when the power is restored.

with Auto-Tuning PID

DC7000 front panel features



Green control indicator lights up when process within ±0.5% of setpoint range

High deviation alarm red arrow relay contact closure

-1999 to +3999 counts

°C and °F models

Low deviation alarm red arrow relay contact closure

Seconds

Keys to change digits above for setting limits or PID parameters

2 Alpha variable identifiers

Bar LED output display

F and D keys cycle the display and function modes

Enter key

Switch selectable input range including remote setpoint

Drop down door with legend of variables

APPLICATIONS

Ovens
Chemical Processing
Curing Process Equipment
Distillation Columns
Dryers
Environmental Chambers
Heat Treating Furnaces
Extruders
Food Processing
Metal Casting
Packaging Machinery
Plastics Processing
Scientific Instruments
Semiconductor Processing
Single Phase Motor Control
Solder Machines
Sterilizers
Temperature Baths

Specifications

Inputs:

Thermocouples	DC701XX:	K, J, T, R, S
Millivolts	DC702XX:	10 to 50 mV (4-20 mA with 2.5Ω shunt resistor)
		0 to 100 mV
		-10 to +10 mV
RTD	DC703XX:	3 wire Platinum 100Ω, α = 0.00385

Accuracy: ±0.3% of full scale plus 1 digit
Display: 7 segment 0.4" LED
4 digits, -1999 to +3999, plus 2 alpha identifiers
5 bar LED output indicator
HI and LO red alarm arrows
Control status indicator, green
Resolution:

Thermocouple and RTD inputs:	1°C/F
RTD -100.0 to +199.9°C input:	0.1°C
Millivolt input, 10 to 50 mV, 0 to 100 mV range:	0.1%
-10 to +10 mV range:	10μV

Temperature Stability: 0.5% output change per 50°F ambient change
Cycle Time:
Display: 0.5 seconds
Output: 1 second for relay output model
Switch selectable from 5, 15, or 30 seconds for relay and SSR
Control Function: PID with automatic tuning
Proportional band: 0.1 to 200.0% (0.1 to 999.9% with auto-tune)
Integral (Reset): 1 to 3600 seconds
Derivative (Rate): 0 to 2000 seconds (0 to 100 sec with auto-tune)
Control Action: Direct/Reverse, switch selectable
Output Limiter: 0 to 100%
Outputs: On/Off relay, Form C, 200 VAC, 2A resistive load
On/Off voltage of 24 V and 0 V for SSR
4 to 20 mA DC max. load of 600Ω
Auto/Manual: Bumpless, balanceless transfer
Reset Windup: Use of velocity algorithm minimizes overshoot
Remote Setpoint: 1 to 5 VDC (input impedance 300KΩ)
Input Impedance: More than 100KΩ for T/C and mV inputs
Noise Rejection:
CMRR: 120 db @ 60 Hz, max. CM voltage 200 VAC
NMRR: 60 db @ 50/60 Hz, max. NM voltage 5V
Alarms:
Upper and lower deviation alarms: 0 to ±1000 for DC701XF, for other models 0 to ± max. scale range
Alarm Outputs: 2 Relays Form A SPST, 200V, 1 amp resistive load
Open Input Protection: Upscale break
Operating Environment: 15 to 130°F (-10 to 55°C) 10 to 95% RH
Dimensions: 3.78"W x 3.78"H x 8.07"D
1/4 DIN (96mm W x 96mm H x 205mm D)
Panel Cutout: 3.63"W x 3.63"H (92mm W x 92mm H)
Weight: 2.65 lbs. (1.2 kg)
Input Power: 110/230 VAC ±10%, 50/60 Hz, 10 VA
Mounting: Panel mount
Case: Black plastic ABS UL94HB
Warranty: 1 year

Input Ranges:

Thermocouple:		
K	-50 to +2370°F	-50 to +1300°C
J	-150 to +1400°F	-100 to + 800°C
T	-300 to + 750°F	-200 to + 400°C
R	0 to +3200°F	0 to +1600°C
S	0 to +3200°F	0 to +1760°C
RTD:		
3 wire Platinum 100Ω α = .00385		
	-150 to + 400°F	-100.0 to +199.9°C
	-325 to +1150°F	-200 to +630 °C

Millivolt:	**Display:**
10 to 50 mV (4-20 mA with 2.5Ω shunt resistor)	0-100.0%
0 to 100 mV	0-100.0%
-10.00 to +10.00 mV	mV

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Telex: (845) 8868923

C8/11-85/10M/AC

DORIC

DC7000 Ordering Guide/Price List

(Prices Effective July 1, 1986)

Model		Price
7000	DIGITAL TEMPERATURE CONTROLLER, single loop, includes panel mounting hardware and owner's manual.	$469.00

Code	Input	Price
1	Thermocouple	N/C
2	Millivolt	N/C
3	RTD	N/C

Code	Output	Price
1	On/Off relay, Form C, 2A	N/C
2	On/Off voltage, for SSR, 24V and 0V.	N/C
5	4-20mA	N/C

Code	Display to Read	Price
F	°F for thermocouple and RTD ranges.	N/C
C	°C for thermocouple and RTD ranges.	N/C
L	Linear 0-100%	N/C

EXAMPLE

70	1	1	F	Model DC7000 Digital Temperature Controller for use with thermocouples, with on/off relay, degrees F.

Model/Code	Accessories Sold Separately	Price
7000-TBPC	Power Cord, 110V, 6 feet long	$7.00
7000-HBK1	Extra Owner's Manual	$7.00
934-0212017	Resistor, 2.5Ω, .05% to accomodate 4-20mA input	$9.00

*Specifications subject to change without notice.

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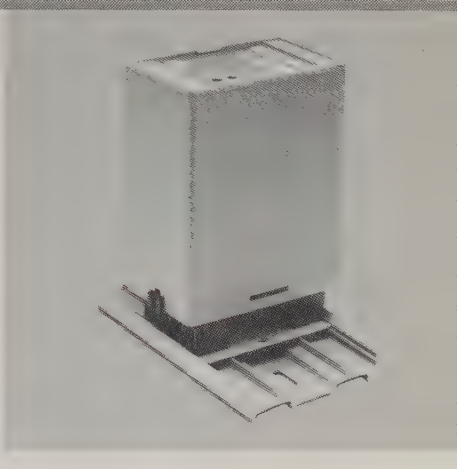
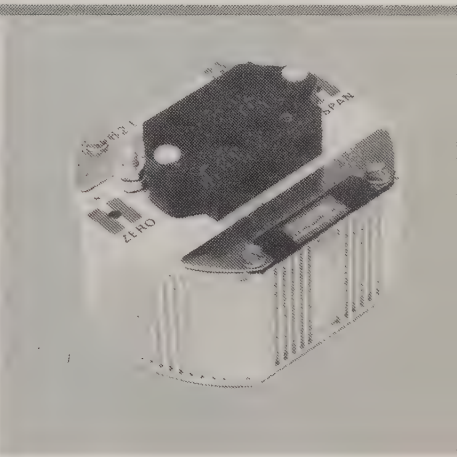
DORIC

SIGNAL CONDITIONING PRODUCTS

PLUG-IN SIGNAL CONDITIONERS



TWO-WIRE TRANSMITTERS



PROCESS INDICATORS

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GENERAL POLICIES

TERMS

1. Net 30 days from date of shipment (invoice date), with credit approval.*
2. FOB Factory-- San Diego, California, USA.*
3. Shipping terms are prepaid and billed on the invoice.

WARRANTY

Three year warranty on plug-in Signal Conditioners and Transmitters.

Repair or replacement if found defective. Consult the factory for immediate service. Contact our Customer Service Department at 1-800-854-2708 (in CA, 1-800-227-9781) from 7:30 a.m. to 5:00 p.m. PST, for a return authorization number.

DELIVERY

Standard products: Four to six weeks ARO.
Non-Standard products: ***Factory approval only.***

Doric Fast Delivery (DFD)**
DFD2 Guaranteed 2 weeks shipment for standard products; 3 weeks shipment for non-standard products

Additional charge per instrument ----------$35.00

DFD1 Guaranteed 1 week shipment for Standard products ***only with Factory approval.***

Additional charge per instrument---------- $70.00

DFD0 Less than 1 week, ***consult Factory for approval and price.***

QUANTITY DISCOUNTS

1-9 units per order----------list price
10-24 units per order----------less 5%
25-99 units per order----------consult Factory

CUSTOM SPECIFIED RANGES

Discounts available with quantities. Consult Factory.

OEM DISCOUNTS

Original Equipment Manufacturer (OEM) discounts are available. The Factory will consult your local Doric representative for assistance in determining eligibility for this program.

Discounts are *not* available for the following items:
1. Doric Fast Delivery charges
2. Tagging requirements
3. Data Sheets/Manuals
4. Schematics
5. Special Services

DOCUMENTATION

One data sheet is supplied with each instrument (includes connecting diagram).

Additional charge per sheet----------$1.00
Schematics----------$10.00

MISCELLANEOUS

Cancellation/Restocking Charge:
25% of net price for standard instruments
80% of net price for specials and custom specified ranges.

Minimum order: $50.00
Non-Taxable: Non-taxable status proof must be in Factory's possession prior to shipment.
Factory will ship partial shipments on large orders unless otherwise instructed.

EQUIIPMENT TAGS

Mylar---------- $5.00
Aluminum----------$10.00

*Exceptions must be approved by the Factory.
**Discounts do not apply to DFD charges.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SELECTION GUIDE

SELECT:	Input
FUNCTION	Model Number

	Thermocouple	DC	RTD	AC	Frequency
LIMIT ALARMS	DP 1200 through DP 1224	DP 1000 through DP 1024	DP1400 through DP1424	DP1600 through DP1624	DP1700 through DP1724
		DT678			

	Thermocouple	DC	RTD	AC	Frequency
GENERAL PURPOSE TRANSMITTERS	DP4100 DP4101 DP4150	DP4010 DP4050 DP4250	DP4001 DP4041 DP4151	DP6010 DP6020	DP7010 DP7050
	DT621 DT723	DT601	DT614 DT610	DT661	DT671

	Potentiometer	Pressure
GENERAL PURPOSE TRANSMITTERS (CONT.)	DP4003	DT690
	DT650	

	Valve/Positioner
DRIVERS	DP3210

	Strain Gauge
TRANSMITTERS WITH EXCITATION	DP4051

	General Purpose	Two-Wire Transmitter
POWER SUPPLIES	DP9050	DP9046

SELECTION GUIDE

ISOLATING TRANSMITTERS

	Thermocouple	DC	Loop-Powered	AC	RTD
	DP4130 DP4150	DP4300 DP4310 DP4155	DP4600	DP6010 DP6020	DP4151
	DT621	DT601	DT600	DT661	

FREQUENCY

	DC to Frequency	Frequency to DC	Frequency Scalers
	DP7500 DP7501	DP7010 DP7050	DP7510 DP7511
		DT671	

TWO-WIRE TRANSMITTERS

	Thermocouple	DC	RTD	Frequency	Potentiometer
	DP4620	DP4650	DP4610	DP4670	DP4630
	DT621 DT723	DT601	DT610 DT614	DT671	DT650

TWO-WIRE TRANSMITTERS (cont.)

	Loop-Powered
	DP4600
	DT600

	Thermocouple	DC	RTD
LINEARIZING TRANSMITTERS	DP4150	DP4155	DP4151
			DT610

	Ramp Buffer	Track/Peak Hold	Root Extractor
PROCESS FUNCTIONS	DP4580	DP4570	DP4440
			DT605

	Thermocouple	DC	RTD	AC
INDICATORS	760 F	189.9	125.9 F	105
		DT608 (600D) DT675		

DP 1000 SERIES LIMIT ALARMS — HOW TO ORDER

HOW TO ORDER A LIMIT ALARM IN THE 1000 SERIES

When building a Model Number to suit your basic requirements, (Basic Model with Options) build your number from the guide below. To select the input range, turn to the page listed for your model type. Add the first, second, third and fourth numbers and their prices to determine your model number and price. Then refer to the example below for further specificaitons.

FIRST NUMBER	INPUT TYPE	PRICE
1___	Base Model	$175.00

SECOND NUMBER	INPUT TYPE	RANGE SELECTION	PRICE
_0__	DC,(mA, mV, V, A)	Page 8	N/C
_2__	Thermocouple	Page 8	$60.00
_4__*	RTD (2 and 3 wire)	Page 9	$60.00
_6__	AC (mA, mV, V, A)	Page 9	$70.00
_7__	Frequency	Page 10	$70.00

THIRD NUMBER	RELAY OUTPUTS	PRICE
__0_	Single Trip Alarm (DPDT)	N/C
__2_	Dual Trip Alarm (2 x SPDT)	$50.00

FOURTH NUMBER	SETPOINT ADJUSTMENT	PRICE
___0	Screwdriver Adjust (Single/Dual)	N/C
___1	Single Turn Dial (Top Mount)	$35.00
___2*	Remote Setpoint Pot (Pot not included)	$15.00
___3*	DC Programmable (0-1VDC)	$35.00
___4	Multi-turn Top Mounted Clock-face Dial (Single/Dual)	$70.00/115.00

LETTER	OPTIONS	PRICE
A	Adjustable Deadband -0.2-96%(Single/Dual)	$25.00/50.00
B	Down Scale Burnout Protection (TC, RTD Inputs)	$10.00
L	LED Trip Status Indicators	$15.00
M	Multi-turn Screwdriver Adjust Setpoint (1 __0) only	$30.00
R	Reverse Relay Sense	$15.00
T*	Transmitter Outputs -Process and setpoint; 0-1V (Single/Dual)	$35.00/55.00
V	Voltage Output; 12V (Replaces Relays)	$15.00
X	Lo- Low Trip/ Dual Low Trip (__2_)	$10.00/20.00
Y	Hi- Dual High Trip (__2_)	$20.00

* Selection of any of these items or a latching style relay requires a DM020 or equivalent for mounting. Any other model in this series requires a DM011 or equivalent.

EXAMPLE: HOW TO BUILD THE MODEL NUMBER AND THE PRICE FOR THE 1000 SERIES

DP1600-DP1624
AC INPUT LIMIT ALARMS

Input	Range	Price	Input	Range	Price
A0	Specify range*	$45.00	A5	0-100mV RMS	N/C
A1	0-100mV RMS	N/C	A6	0-120mV RMS	N/C

Ouput	Relay	Price
N	Non-latching	N/C
L	Latching	$25.00

Power	Voltage	Price
F	120 Vac	N/C
H	220 Vac	N/C
R	24 Vdc	$60.00

1623	A1	L	R	A, L	=	1623, A1, L, R, A, L
Model No.	Input	Output	Power	Options		Complete Model No.
Model $ 330.00	$ 0	$ 25.00	$ 60.00	$ 65.00	=	Total $ 480.00

DP1000-DP1024
DC VOLTAGE OR CURRENT LIMIT ALARMS (See base price on page 7)

Input	Current	Price	Input	Voltage	Price
A	4-20mA	N/C	2	0-100mV	N/C
B	2-10mA	N/C	3	0-1V	N/C
C	1-5mA	N/C	4	0-10V	N/C
D	0-20mA	N/C	5	0-5V	N/C
E	0-16mA	N/C	6	1-5V	N/C
F	0-10mA	N/C	0	Specify Range*	$45.00
G	0-1mA	N/C			
H	10-50mA	N/C			
Z	Specify Range*	$45.00			

Output	Relay	Price
N	Non-latching	N/C
L	Latching	$25.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Options		Complete Model No.
Base $	+	$	+	$	+	$	+	$	=	Total $

DP1200-DP1224
THERMOCOUPLE LIMIT ALARMS (See base price on page 7)

Input	Ranges	Price	Input	Ranges	Price	Input	Ranges	Price
J0	Specify Range*	$45.00	K0	Specify Range*	$45.00	R0	Specify Range*	$45.00
J1	-100 to +300°F	N/C	K1	0-400°F	N/C	R1	0-2000°F	N/C
J2	0-400°F	N/C	K2	0-500°F	N/C	R2	0-2500°F	N/C
J3	0-500°F	N/C	K3	0-600°F	N/C	R3	0-1000°C	N/C
J4	0-600°F	N/C	K4	0-1000°F	N/C	S0	Specify Range*	$45.00
J5	0-1000°F	N/C	K5	0-1500°F	N/C	S1	0-2000°F	N/C
J6	0-1200°F	N/C	K6	0-2000°F	N/C	S2	0-2500°F	N/C
J7	-200 to +100°C	N/C	K7	0-2500°F	N/C	S3	0-1000°C	N/C
J8	0-200°C	N/C	K8	-200 to +100°C	N/C	T0	Specify Range*	$45.00
J9	0-500°C	N/C	K9	0-500°C	N/C	T1	0-400°F	N/C
			K10	0-1000°C	N/C	T2	0-500°F	N/C
						T3	0-600°F	N/C
						T4	0-250°C	N/C
						T5	-250 to +250°C	N/C

Output	Relay	Price
N	Non-latching	N/C
L	Latching	$25.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Options		Complete Model No.
Base $	+	$	+	$	+	$	+	$	=	Total $

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP1400-DP1424
RTD LIMIT ALARMS, THREE-WIRE RTD'S (See base price on page 7)

Input	Range	Price	Input	Range	Price
PT0	Specify Range*	$45.00	PT6	0-100°C	N/C
PT1	0-200°F	N/C	PT7	0-150°C	N/C
PT2	0-300°F	N/C	PT8	0-200°C	N/C
PT3	0-400°F	N/C	PT9	0-250°C	N/C
PT4	0-500°F	N/C	PT10	0-500°C	N/C
PT5	0-1000°F	N/C			

(Standard Input 100Ω PT RTD)

Output	Relay	Price
N	Non-latching	N/C
L	Latching	$25.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.	Input	Output	Power	Options	Complete Model No.

Base $	+	$	+	$	+	$	+	$	=	Total $

DP1600-DP1624
AC INPUT LIMIT ALARMS (See base price on page 7)

Input	Range	Price	Input	Range	Price
A0	(V)Specify Range*	$45.00	A5	0-10V RMS	N/C
A1	0-100mV RMS	N/C	A6	0-120V RMS	N/C
A2	0-500mV RMS	N/C	A7	0-150V RMS	N/C
A3	0-1V RMS	N/C	AD	0-500mA RMS	N/C
A4	0-5V RMS	N/C	AE	0-1A RMS	N/C
			AZ	(I) Specify Range*	$45.00

Output	Relay	Price
N	Non-latching	N/C
L	Latching	$25.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.	Input	Output	Power	Options	Complete Model No.

Base $	+	$	+	$	+	$	+	$	=	Total $

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP1700-DP1724
FREQUENCY LIMIT ALARM (See base price on page 7)

Input	Range	Price	Input	Range	Price
F0	Specify Range*	$45.00	F7	0-1500Hz	N/C
F2	0-100Hz	N/C	F8	0-2000Hz	N/C
F5	0-500Hz	N/C	F9	0-5000Hz	N/C
F6	0-1000Hz	N/C			

Output	Relay	Price
N	Non-latching	N/C
L	Latching	$25.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Options		Complete Model No.
Base $	+	$	+	$	+	$	+	$	=	Total $

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP3210
VALVE POSITIONER, SOLID-STATE RELAY

Base Price $285.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5	N/C
0	Specify Range*	$45.00

Output	Solid-State Relay	Price
VC	1A @ 120Vac	N/C

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.	-	Input	Output	Power	Complete Model No.

Base $ 285.00	+	$	+	$	+	$	=	Total $

Mounting requires DM011 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4001
RTD TRANSMITTER, THREE-WIRE RTD'S Base Price $250.00

Input	Range	Price	Input	Range	Price
PT0	Specify Range*	$45.00	PT6	0-100°C	N/C
PT1	0-200°F	N/C	PT7	0-150°C	N/C
PT2	0-300°F	N/C	PT8	0-200°C	N/C
PT3	0-400°F	N/C	PT9	0-250°C	N/C
PT4	0-500°F	N/C	PT10	0-500°C	N/C
PT5	0-1000°F	N/C			

(Standard Input 100Ω PT RTD)

Output	Current	Price	Output	Voltage	Price
A	4-20mA	N/C	2	0-100mV	N/C
B	2-10mA	N/C	3	0-1V	N/C
C	1-5mA	N/C	4	0-10V	N/C
D	0-20mA	N/C	5	0-5V	N/C
E	0-16mA	N/C	6	1-5V	N/C
F	0-10mA	N/C	0	Specify Range*	$45.00
G	0-1mA	N/C			
Z	Specify Range*	$45.00			

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 250.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4003
POTENTIOMETER/SLIDEWIRE TRANSMITTER

Base Price $230.00

Input	Range	Price
R0	Specify Range*	$45.00
R1	100Ω - 100kΩ, any value	N/C

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 230.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4010
DC TRANSMITTER; NON-ISOLATED

Base Price $195.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-1mA	N/C
G	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 195.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for examole). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4041
DIFFERENTIAL RTD TRANSMITTER, TWO-WIRE RTD INPUT Base Price $325.00

Input	Range	Price	Input	Range	Price
RD0	Specify Range*	$45.00	RD5	±5°C	N/C
RD1	±10°F	N/C	RD6	0-10°C	N/C
RD2	0-20°F	N/C	RD7	±10°C	N/C
RD3	±20°F	N/C	RD8	±20°C	N/C
RD4	0-40°F	N/C			

(Specify HI/LO working temperature on your process.) (Standard RTD 100Ω PT)

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 325.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("RD0" for example). Consult tables at the back of this booklet for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4050
DC VOLTAGE TRANSMITTER (10mV-50mV spans) Base Price $225.00

Input	Range	Price	Input	Range	Price
VL0	Specify Range*	N/C	VL3	0-25mV	N/C
VL1	0-10mV	N/C	VL4	0-50mV	N/C
VL2	0-20mV	$45.00	VZ	(I) Specify Range*	$45.00

Output	Current	Price	Output	Voltage	Price
A	4-20mA	N/C	2	0-100mV	N/C
B	2-10mA	N/C	3	0-1V	N/C
C	1-5mA	N/C	4	0-10V	N/C
D	0-20mA	N/C	5	0-5V	N/C
E	0-16mA	N/C	6	1-5V	N/C
F	0-10mA	N/C	0	Specify Range*	$45.00
G	0-1mA	N/C			
Z	Specify Range*	$45.00			

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 225.00	+	$	+	$	+	$	=	Total $

Mounting Requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4051
BRIDGE INPUT/LOAD CELL TRANSMITTER (excitation 5V) Base Price $275.00

Input	Range	Price	Input	Range	Price
B0	Specify Range*	$45.00	B4	5mV/V	N/C
B1	2mV/V	N/C	B5	10mV/V	N/C
B2	3mV/V	N/C	B6	20mV/V	N/C
B3	4mV/V	N/C			

Output	Current	Price	Output	Voltage	Price
A	4-20mA	N/C	2	0-100mV	N/C
B	2-10mA	N/C	3	0-1V	N/C
C	1-5mA	N/C	4	0-10V	N/C
D	0-20mA	N/C	5	0-5V	N/C
E	0-16mA	N/C	6	1-5V	N/C
F	0-10mA	N/C	0	Specify Range*	$45.00
G	0-1mA	N/C			
Z	Specify Range*	$45.00			

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 275.00	+	$	+	$	+	$	=	Total $

Mounting requires DM011 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4100
THERMOCOUPLE TRANSMITTER, NON-ISOLATING Base Price $250.00

Input	Range	Price
J0	Specify Range*	$45.00
J1	-100 to +300°F	N/C
J2	0-400°F	N/C
J3	0-500°F	N/C
J4	0-600°F	N/C
J5	0-1000°F	N/C
J6	0-1200°F	N/C
J7	-200 to +100°C	N/C
J8	0-200°C	N/C
J9	0-500°C	N/C

Input	Range	Price
K0	Specify Range*	$45.00
K1	0-400°F	N/C
K2	0-500°F	N/C
K3	0-600°F	N/C
K4	0-1000°F	N/C
K5	0-1500°F	N/C
K6	0-2000°F	N/C
K7	0-2500°F	N/C
K8	-200 to +100°C	N/C
K9	0-500°C	N/C
K10	0-1000°C	N/C

Input	Range	Price
R0	Specify Range*	$45.00
R1	0-2000°F	N/C
R2	0-2500°F	N/C
R3	0-1000°C	N/C
S0	Specify Range*	$45.00
S1	0-2000°F	N/C
S2	0-2500°F	N/C
S3	0-1000°C	N/C
T0	Specify Range*	$45.00
T1	0-400°F	N/C
T2	0-500°F	N/C
T3	0-600°F	N/C
T4	0-250°C	N/C
T5	-250°C to 250°C	N/C

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 250.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4101
THERMOCOUPLE; NON-ISOLATING (Narrow Span)

Base Price $295.00

Input	Range	Price	Input	Range	Price	Input	Range	Price
LJ0	Specify Range*	$45.00	LK0	Specify Range*	$45.00	LR0	Specify Range*	$45.00
LJ1	0-200°F	N/C	LK1	0-250°F	N/C	LR1	0-750°F	N/C
LJ2	0-300°F	N/C	LK2	0-300°F	N/C	LR2	0-500°C	N/C
LJ3	0-100°C	N/C	LK3	0-125°C	N/C			
LJ4	0-150°C	N/C	LK4	0-200°C	N/C			

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z*	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 295.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4130
THERMOCOUPLE, ISOLATED

Base Price $320.00

Input	Range	Price	Input	Range	Price	Input	Range	Price
J0	Specify Range*	$45.00	K0	Specify Range*	$45.00	R0	Specify Range*	$45.00
J1	-100 to +300°F	N/C	K1	0-400°F	N/C	R1	0-2000°F	N/C
J2	0-400°F	N/C	K2	0-500°F	N/C	R2	0-2500°F	N/C
J3	0-500°F	N/C	K3	0-600°F	N/C	R3	0-1000°C	N/C
J4	0-600°F	N/C	K4	0-1000°F	N/C	S0	Specify Range*	$45.00
J5	0-1000°F	N/C	K5	0-1500°F	N/C	S1	0-2000°F	N/C
J6	0-1200°F	N/C	K6	0-2000°F	N/C	S2	0-2500°F	N/C
J7	-200 to +100°C	N/C	K7	0-2500°F	N/C	S3	0-1000°C	N/C
J8	0-200°C	N/C	K8	-200 to +100°C	N/C	T0	Specify Range*	$45.00
J9	0-500°C	N/C	K9	0-500°C	N/C	T1	0-400°F	N/C
			K10	0-1000°C	N/C	T2	0-500°F	N/C
						T3	0-600°F	N/C
						T4	0-250°C	N/C
						T5	-250 to +250°C	N/C

Output	Current	Price	Output	Voltage	Price
A	4-20mA	N/C	2	0-100mV	N/C
B	2-10mA	N/C	3	0-1V	N/C
C	1-5mA	N/C	4	0-10V	N/C
D	0-20mA	N/C	5	0-5V	N/C
E	0-16mA	N/C	6	1-5V	N/C
F	0-10mA	N/C	0	Specify Range*	$45.00
G	0-1mA	N/C			
Z	Specify Range*	$45.00			

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 320.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4150
THERMOCOUPLE TRANSMITTER, ISOLATED, LINEARIZING

Base Price $350.00

Input	Range	Price
J0	Specify Range*	$45.00
J1	-100 to +300°F	N/C
J2	0-400°F	N/C
J3	0-500°F	N/C
J4	0-600°F	N/C
J5	0-1000°F	N/C
J6	0-1200°F	N/C
J7	-200 to +100°C	N/C
J8	0-200°C	N/C
J9	0-500°C	N/C

Input	Range	Price
K0	Specify Range*	$45.00
K1	0-400°F	N/C
K2	0-500°F	N/C
K3	0-600°F	N/C
K4	0-1000°F	N/C
K5	0-1500°F	N/C
K6	0-2000°F	N/C
K7	0-2500°F	N/C
K8	-200 to +100°C	N/C
K9	0-500°C	N/C
K10	0-1000°C	N/C

Input	Range	Price
R0	Specify Range*	$45.00
R1	0-2000°F	N/C
R2	0-2500°F	N/C
R3	0-1000°C	N/C
S0	Specify Range*	$45.00
S1	0-2000°F	N/C
S2	0-2500°F	N/C
S3	0-1000°C	N/C
T0	Specify Range*	$45.00
T1	0-400°F	N/C
T2	0-500°F	N/C
T3	0-600°F	N/C
T4	0-250°C	N/C
T5	-250° to +250°C	N/C

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.	Input	Output	Power	Complete Model No.

Base $ 350.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4151
RTD TRANSMITTER, LINEARIZED, ISOLATED Base Price $295.00

Input	Range	Price	Input	Range	Price
PT0	Specify Range*	$45.00	PT6	0-100°C	N/C
PT1	0-200°F	N/C	PT7	0-150°C	N/C
PT2	0-300°F	N/C	PT8	0-200°C	N/C
PT3	0-400°F	N/C	PT9	0-250°C	N/C
PT4	0-500°F	N/C	PT10	0-500°C	N/C
PT5	0-1000°F	N/C			

Output	Current	Price	Output	Voltage	Price
A	4-20mA	N/C	2	0-100mV	N/C
B	2-10mA	N/C	3	0-1V	N/C
C	1-5mA	N/C	4	0-10V	N/C
D	0-20mA	N/C	5	0-5V	N/C
E	0-16mA	N/C	6	1-5V	N/C
F	0-10mA	N/C	0	Specify Range*	$45.00
G	0-1mA	N/C			
Z	Specify Range*	$45.00			

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 295.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("PT0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 permodule.

DP4155
DC TRANSMITTER, LINEARIZED, ISOLATED

Base Price $375.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

(Input formula for I/O relationship is required)

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 375.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4300
DC VOLTAGE TRANSMITTER, ISOLATED

Base Price $285.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 285.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4310
DC VOLTAGE TRANSMITTER, ISOLATED (narrow span) Base Price $325.00

Input	Range	Price	Input	Range	Price
VL0	(V)Specify Range*	$45.00	VL3	0-25mV	N/C
VL1	0-10mV	N/C	VL4	0-50mV	N/C
VL2	0-20mV	N/C	VZ	(I) Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 325.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

For ranges not listed, indicate "Specify Range designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4370
HIGH-SPEED ISOLATOR

Base Price $355.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 355.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

For ranges not listed, indicate "Specify Range designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4440
SQUARE ROOT EXTRACTOR

Base Price $395.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 395.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

For ranges not listed, indicate "Specify Range designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4570
PEAK/HOLD FUNCTION MODULE

Base Price $365.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Options	Hold	Price
P	Peak Hold	N/C
V	Valley Hold	N/C
T	Track Hold	N/C

Base Model No.		Input		Output		Power		Options		Complete Model No.
Base $ 365.00	+	$	+	$	+	$	+	N/C	=	Total $

Mounting requires DM011 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("JO" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4580
CONSTANT RESPONSE TRANSMITTER

Base Price $265.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
2	0-100mV	N/C
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.				Complete Model No.
Base $ 265.00 +	$ +	$ +	$ =	Total $

Mounting requires DM008 or equivalent.

For ranges not listed, indicate "Specify Range designator ("JO" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4600
LOOP ISOLATOR TRANSMITTER, TWO-WIRE

Base Price $285.00

Input	Current	Price	Output	Current	Price
A	4-20mA	N/C	A	4-20mA	N/C

Base Model No.		Input		Output		Complete Model No.
Base $ 285.00	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

DP4610
RTD TRANSMITTER, TWO-WIRE TRANSMITTER

Base Price $285.00

Input	Range	Price	Input	Range	Price
PT0	Specify Range*	$45.00	PT6	0-100°C	N/C
PT1	0-200°F	N/C	PT7	0-150°C	N/C
PT2	0-300°F	N/C	PT8	0-200°C	N/C
PR3	0-400°F	N/C	PT9	0-250°C	N/C
PT4	0-500°F	N/C	PT10	0-500°C	N/C
PT5	0-1000°F	N/C			

Output	Current	Price
A	4-20mA	N/C

Base Model No.		Input		Output		Complete Model No.
Base $ 285.00	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

For ranges not listed, indicate "Specify Range" designator ("PT0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4620
THERMOCOUPLE TRANSMITTER, TWO-WIRE Base Price $285.00

Input	Range	Price	Input	Range	Price	Input	Range	Price
J0	Specify Range*	$45.00	K0	Specify Range*	$45.00	R0	Specify Range*	$45.00
J1	-100 to +300°F	N/C	K1	0-400°F	N/C	R1	0-2000°F	N/C
J2	0-400°F	N/C	K2	0-500°F	N/C	R2	0-2500°F	N/C
J3	0-500°F	N/C	K3	0-600°F	N/C	R3	0-100°C	N/C
J4	0-600°F	N/C	K4	0-1000°F	N/C	S0	Specify Range*	$45.00
J5	0-1000°F	N/C	K5	0-1500°F	N/C	S1	0-2000°F	N/C
J6	0-1200°F	N/C	K6	0-2000°F	N/C	S2	0-2500°F	N/C
J7	-200 to +100°C	N/C	K7	0-2500°F	N/C	S3	0-1000°C	N/C
J8	0-200°C	N/C	K8	-200 to +100°C	N/C	T0	Specify Range*	$45.00
J9	0-500°C	N/C	K9	0-500°C	N/C	T1	0-400°F	N/C
			K10	0-1000°C	N/C	T2	0-500°F	N/C
						T3	0-600°F	N/C
						T4	0-250°C	N/C
						T5	-250 to +250°C	N/C

Output	Current	Price
A	4-20mA	N/C

Base Model No.		Input		Output		Complete Model No.
Base $ 285.00	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

DP4630
POTENTIOMETER/SLIDEWIRE TRANSMITTER, TWO-WIRE Base Price $285.00

Input	Range	Price	Output	Current	Price
R	100Ω-10kΩ, any value pot	N/C	A	4-20mA	N/C

Base Model No.		Input		Output		Complete Model No.
Base $ 285.00	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP4650
DC VOLTAGE OR CURRENT TRANSMITTER, TWO-WIRE

Base Price $285.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
G	0-1mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C

Base Model No.		Input		Output		Complete Model No.
Base $ 285.00	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

DP4670
FREQUENCY TRANSMITTER, TWO-WIRE

Base Price $285.00

Input	Range	Price
F0	Specify Range*	$45.00
F2	0-100Hz	N/C
F5	0-500Hz	N/C

Input	Range	Price
F6	0-1000Hz	N/C
F7	0-1500Hz	N/C

Output	Current	Price
A	4-20mA	N/C

Base Model No.		Input		Output		Complete Model No.
Base $ 285.00	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

For ranges not listed, indicate "Specify Range designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP6010
AC VOLTAGE CONVERTER

Base Price $295.00

Input	Range	Price	Input	Range	Price
A0	Specify Range*	$45.00	A4	0-5V RMS	N/C
A1	0-100mV RMS	N/C	A5	0-10V RMS	N/C
A2	0-500mV RMS	N/C	A6	0-120V RMS	N/C
A3	0-1V RMS	N/C	A7	0-150V RMS	N/C

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 295.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP6020
AC CURRENT CONVERTER

Base Price $295.00

Input	Range	Price	Input	Range	Price
A0	Specify Range*	$45.00	AE	0-1A RMS	N/C
AD	0-500mA RMS	N/C	AF	0-5A RMS	N/C

Output	Current	Price	Output	Voltage	Price
A	4-20mA	N/C	3	0-1V	N/C
B	2-10mA	N/C	4	0-10V	N/C
C	1-5mA	N/C	5	0-5V	N/C
D	0-20mA	N/C	6	1-5V	N/C
E	0-16mA	N/C	0	Specify Range*	$45.00
F	0-10mA	N/C			
Z	Specify Range*	$45.00			

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 295.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP7010
FREQUENCY TO DC CONVERTER, GENERAL PURPOSE, ISOLATED

Base Price $295.00

Input	Range	Price	Input	Range	Price
F0	Specify Range*	$45.00	F6	0-1000Hz	N/C
F2	0-100Hz	N/C	F9	0-5000Hz	N/C
F5	0-500Hz	N/C	F10	0-10kHz	N/C

Output	Current	Price	Output	Voltage	Price
A	4-20mA	N/C	3	0-1V	N/C
B	2-10mA	N/C	4	0-10V	N/C
C	1-5mA	N/C	5	0-5V	N/C
D	0-20mA	N/C	6	1-5V	N/C
E	0-16mA	N/C	0	Specify Range*	$45.00
F	0-10mA	N/C			
Z	Specify Range*	$45.00			

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 295.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP7050
LOW FREQUENCY INPUT CONVERTER (0.1-50Hz)

Base Price $350.00

Input	Range	Price	Input	Range	Price
FL0	Specify Range*	$45.00	FL4	0-5Hz	N/C
FL1	0-1Hz(0-60ppm)	N/C	FL5	0-10Hz	N/C
FL2	0-1.6Hz(0-100ppm)	N/C	FL6	0-50Hz	N/C
FL3	0-2Hz	N/C			

Output	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
Z	Specify Range*	$45.00

Output	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 350.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP7500
DC TO FREQUENCY CONVERTER, SQUARE WAVE OUT, ISOLATED

Base Price $280.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output - Selectable range from 0-9ppm to 0-10kHz	Price
6V - Voltage output, 6volt	N/C
OC - Open collector output	$25.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.	Input	Output	Power	Complete Model No.

Base $ 280.00	+	$	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP7501
DC TO FREQUENCY INTEGRATOR, RELAY OUT

Base Price $295.00

Input	Current	Price
A	4-20mA	N/C
B	2-10mA	N/C
C	1-5mA	N/C
D	0-20mA	N/C
E	0-16mA	N/C
F	0-10mA	N/C
H	10-50mA	N/C
Z	Specify Range*	$45.00

Input	Voltage	Price
3	0-1V	N/C
4	0-10V	N/C
5	0-5V	N/C
6	1-5V	N/C
0	Specify Range*	$45.00

Output - Selectable range from 0.1ppm to 130ppm	Price
FR - Relay	N/C

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.	Input	Output	Power	Complete Model No.

Base $ 295.00	+	$	+	$	+	$	=	Total $

Mounting requires DM011 or equivalent.

DP7510
FREQUENCY SCALER, SQUARE WAVE OUT, ISOLATED

Base Price $375.00

Input	Range	Price
FR	Any frequency up to 100kHz	N/C

Output	Selectable scaling 0.00001-0.9999	Price
5V	5V pulse	N/C
24	24V pulse	$15.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.	Input	Output	Power	Complete Model No.

Base $ 375.00	+	$	+	$	+	$	=	Total $

Mounting requires DM011 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP7511
FREQUENCY SCALER, SINGLE RELAY OUT

Base Price $395.00

Input	Range	Price
FR	Any frequency up to 100kHz	N/C

Output - Selectable scaling from 0.00001-0.99999		Price
N	Relay	N/C
ER	External relay drive (12Vdc)	$15.00

Power	Voltage	Price
F	120Vac	N/C
H	220Vac	N/C
R	24Vdc	$60.00

Base Model No.		Input		Output		Power		Complete Model No.
Base $ 395.00	+	$	+	$	+	$	=	Total $

Mounting requires DM011 or equivalent.

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP9046
LOOP POWER SUPPLY FOR TWO-WIRE TRANSMITTER Base Price $95.00

Input	Current		Output	Voltage	
F H	120Vac 220Vac	N/C N/C	24	24Vdc regulated, @65mA 40V unregulated	N/C N/C

Base Model No.		Input		Output		Complete Model No.
Base $ 95.00	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

DP9050
STRAIN GAUGE EXCITATION/REFERENCE SUPPLY Base Price $125.00

Input	Current	Price	Output	Voltage	Price
F H	120Vac 220Vac	N/C N/C	315 530	3-15Vdc, adjustable @ 65mA 5-30Vdc, adjustable	N/C N/C

Base Model No.		Input		Output		Complete Model No.
Base $ 125.00	+	$	+	$	=	Total $

Mounting requires DM008 or equivalent.

MOUNTING SOCKETS

NUMBER	DESCRIPTION	PRICE
DM004	Channel Track for Mounting Sockets, Four 1- foot lengths	$10.00
DM008	8 Pin Socket Connector Board	$12.00
DM011	11 Pin Socket Connector Board	$15.00
DM020	20 Pin Socket Connector Board	$20.00
DM800	Retaining Spring	$ 2.00

POTENTIOMETERS

NUMBER	DESCRIPTION	PRICE
DD001	One Turn Potentiometer with Dial Plate- 0-100%	$30.00
DD002	Ten Turn Potentiometer, Digital Dial- 0-999 Counts	$80.00
DD003	Rotary Selector Switch, 3 position with Face Plate (Potentiometer values 1kΩ)	$50.00

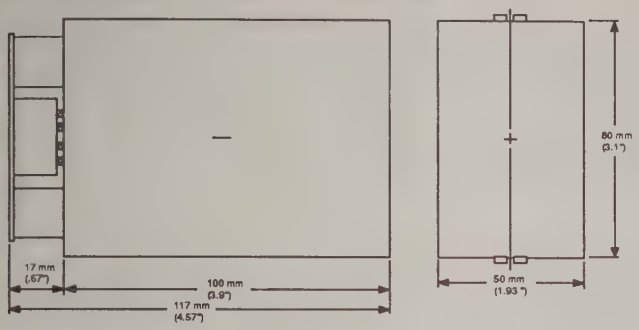
ENCLOSURES

NUMBER	DESCRIPTION	PRICE
DM501	Metal- 6 x 6 x 6 Inches, General Purpose	$ 40.00
DM502	Metal- 10 x 8 x 6 Inches, General Purpose	$ 75.00
DM551	Nema- 4 Rated 6 x 6 x 6 Inches	$100.00
DM552	Nema- 4 Rated 10 x 8 x 6 Inches	$115.00

SHUNT RESISTORS

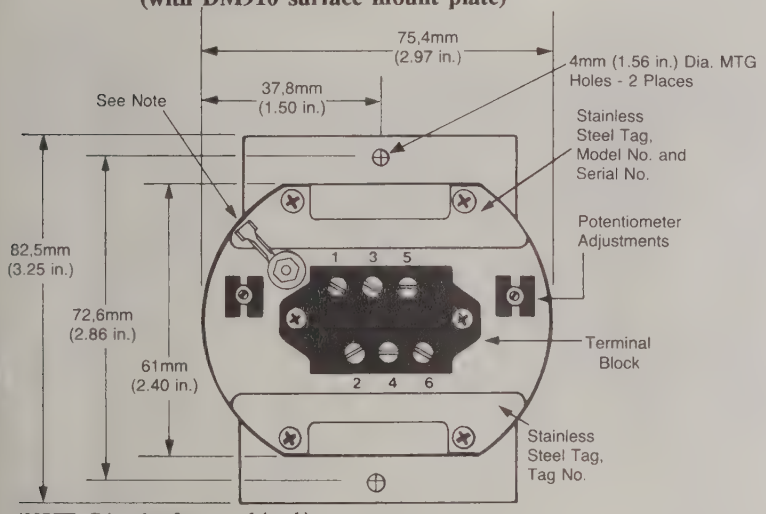
NUMBER	DESCRIPTION	PRICE
DC006	0.1Ω Shunt Resistor (5 Watt) for 5 Amp Inputs	$10.00
DC007	0.1Ω Shunt Resistor (50 Watts) for Motor Start Applications	$60.00

DP DIMENSIONS

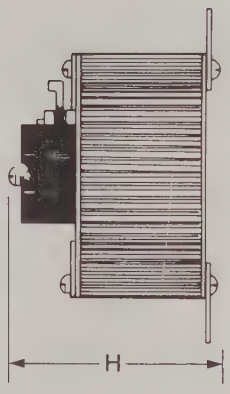


DT DIMENSIONS

(with DM910 surface mount plate)



*NOTE: Crimp-lug for ground (earth).

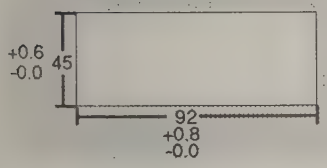


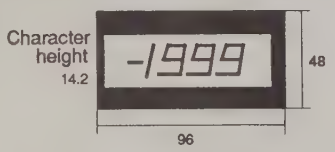
H=Heights vary with model.
See individual data sheet.

60 DIMENSIONS

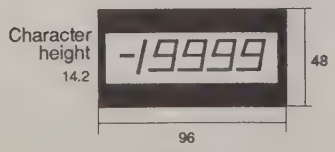
INSTRUMENTATION DIMENSIONS
(All dimensions in millimeters)

Panel Cut-Out

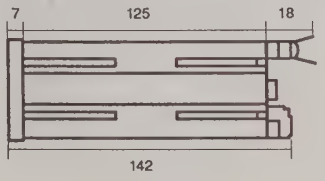


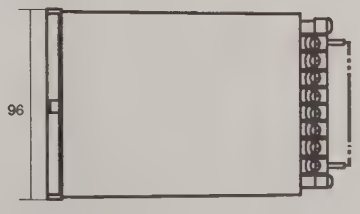


Model 63A

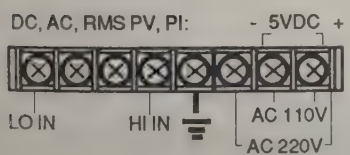


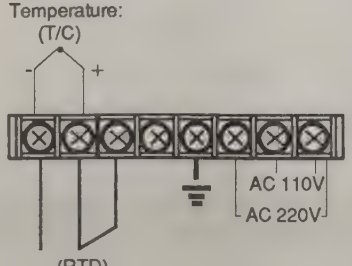
Model 64A





INSTRUMENT ELECTRICAL HOOK-UP*





*Earlier versions may have power input differences than shown here. Tag on meter verifies actual hook-up locations.

DT600
LOOP POWERED ISOLATOR Base Price $250.00

Input	Current	Price	Output	Current	Price
A	4-20mA	N/C	A	4-20mA	N/C
H	10-50mA	N/C	H	10-50mA	$25.00

(Input and output must be the same)

Base Model No.		Input		Output		Complete Model No.
Base $ 250.00	+	$	+	$	=	Total $

DT600D (Model DT608)
LOOP POWERED INDICATOR, FIELD RANGING Base Price $255.00

Input	Current	Price	Display	Range	Price
A	4-20mA	N/C	FS	Standard: +1999	N/C
H	10-50mA	N/C	CA	Special cal. to customer	$10.00
	(user selectable)			requirements (specify)	

Base Model No.		Input		Output		Complete Model No.
Base $ 255.00	+	$	+	$	=	Total $

DT601
DC INPUT, ISOLATING Base Price $325.00

Input	Current	Price	Input	Voltage	Price
A	4-20mA	N/C	3	0-1V	N/C
D	0-20mA	N/C	4	0-10V	N/C
H	10-50mA	N/C	5	0-5V	N/C
Z	Specify Range*	$45.00	6	1-5V	N/C
			0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
H	10-50mA	$25.00

Base Model No.		Input		Output		Complete Model No.
Base $ 325.00	+	$	+	$	=	Total $

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DP605
SQUARE ROOT EXTRACTOR Base Price $325.00

Input	Current	Price	Output	Current	Price
A	4-20mA	N/C	A	4-20mA	N/C
H	10-50mA	N/C	H	10-50mA	$25.00

(Input and Output must be the same)

Base Model No.	Input	Output	Complete Model No.

Base $ 325.00 + $ + $ = Total $

DT610
RTD INPUT TWO OR THREE-WIRE, NON-ISOLATING Base Price $255.00

Input	Range	Price	Input	Range	Price
PT0	Specify Range*	$45.00	PT6	0-100°C	N/C
PT1	0-200°F	N/C	PT7	0-150°C	N/C
PT2	0-300°F	N/C	PT8	0-200°C	N/C
PT3	0-400°F	N/C	PT9	0-250°C	N/C
PT4	0-500°F	N/C	PT10	0-500°C	N/C
PT5	0-1000°F	N/C			

(Standard Input is 100Ω PT)

Output	Current	Price
A	4-20mA	N/C
H	10-50mA	$25.00

Base Model No.	Input	Output	Complete Model No.

Base $ 255.00 + $ + $ = Total $

*For ranges not listed, indicate RTD type and range ("Cu10, 20-220°F" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DT614
DIFFERENTIAL RTD INPUT Base Price $400.00

Input	Range	Price	Input	Range	Price
RD0	Specify Range*	$45.00	RD5	±5°C	N/C
RD1	±10°F	N/C	RD6	0-10°C	N/C
RD2	0-20°F	N/C	RD7	±10°C	N/C
RD3	±20°F	N/C	RD8	±20°C	N/C
RD4	0-40°F	N/C			

(Standard Input is 100Ω PT)

Output	Current	Price
A	4-20mA	N/C
H	10-50mA	$25.00

Base Model No.		Input		Output	=	Complete Model No.
Base $ 400.00	+	$	+	$	=	Total $

*For ranges not listed, indicate RTD type and range ("Cu10, 20-220°F" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DT621
THERMOCOUPLE INPUT, ISOLATING Base Price $370.00

Input	Range	Price	Input	Range	Price
J0	Specify Range*	$45.00	K0	Specify Range*	$45.00
J3	0-500°F	N/C	K2	0-500°F	N/C
J4	0-600°F	N/C	K3	0-600°F	N/C
J5	0-1000°F	N/C	K4	0-1000°F	N/C
J6	0-1200°F	N/C	K5	0-1500°F	N/C
J7	1200°F	N/C	K6	0-2000°F	N/C
J8	-200 to +100°C	N/C	K7	0-2500°F	N/C
J9	0-200°C	N/C	K8	-200 to +100°C	N/C
J10	0-500°C	N/C	K9	0-500°C	N/C
			K10	0-1000°C	N/C

Output	Current	Price
A	4-20mA	N/C
H	10-50mA	$25.00

Base Model No.		Input		Output	=	Complete Model No.
Base $ 370.00	+	$	+	$	=	Total $

*For ranges not listed, indicate "Specify Range" designator ("J0" for example). Consult tables at the back of this book for acceptable ranges and list your required range when ordering. Charge for specified ranges on input and/or output is $45.00 per module.

DT650
THREE-WIRE POTENTIOMETER/SLIDEWIRE INPUT

Base Price $270.00

Input	Range	Price
R	100Ω-10kΩ	N/C
R0	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
H	10-50mA	$25.00

(0-100% of Pot)

Base Model No.		Input		Output		Complete Model No.
Base $ 270.00	+	$	+	$	=	Total $

DT661
AC INPUT TRANSMITTER, ISOLATED

Base Price $270.00

Input	Range	Price
AF	0-5A RMS	N/C
A4	0-5V RMS	N/C
A5	0-10V RMS	N/C

Input	Range	Price
A6	0-10V RMS	N/C
A7	0-150V RMS	N/C

Output	Current	Price
A	4-20mA	N/C
H	10-50mA	$25.00

Base Model No.		Input		Output		Complete Model No.
Base $ 270.00	+	$	+	$	=	Total $

*Specify range as resistance and % of pot when ordering other than standard resistance ranges.

DT671
FREQUENCY INPUT, ISOLATING Base Price $310.00

Input	Range	Span adjustable down to:	Price
FRA	0-100Hz	50Hz	N/C
FRB	0-200Hz	100Hz	N/C
FRC	0-400Hz	200Hz	N/C
FRD	0-800Hz	400Hz	N/C
FRE	0-1600Hz	800Hz	N/C
FRF	0-3200Hz	1600Hz	N/C
FRG	0-6400Hz	3200Hz	N/C
FR0	Specify Range*	Specify Range*	$45.00

Output	Current	Price
A	4-20mA	N/C
H	10-50mA	$25.00

Base Model No.	Input	Output	Complete Model No.

Base $ 310.00 + $ + $ = Total $

DT675D (Model DT675)
INTEGRATING TOTALIZER, EIGHT-DIGIT, FIELD RANGING Base Price $525.00

Input	Current	Price
A	4-20mA	N/C
H	10-50mA	N/C

(Field Selectable)

Output	Range	Price
FS	Field Selectable	N/C
CA	Custom Calibration (Specify Range)	$20.00

Options		Price
RS	External Reset Button	$25.00

Base Model No.	Input	Output	Options	Complete Model No.

Base $ 525.00 + $ + $ + $ = Total $

DT678
LOOP POWERED LIMIT ALARM

Base Price $240.00

Input	Current	Price	Output	Configuration	Price
A	4-20mA	N/C	H1	High Trip Failsafe	N/C
H	10-50mA	$25.00	H2	High Trip Standard	N/C
			L1	Low Trip Failsafe	N/C
			L2	Low Trip Standard	N/C

(Solid State Relay SPST 1.5 @ 120Vac)

Options		Price
AD	Adjustable Deadband 1-25%	$25.00
MR	Latching	$15.00

Base Model No.	Input	Output	Options	Complete Model No.

Base $ 240.00 + $ + $ + $ = Total $

DT690
PRESSURE TO CURRENT CONVERTER

Base Price $310.00

Input	Range	Price	Output	Current	Price
PS1	3-15psig	N/C	A	4-20mA	N/C
PS2	3-27psig	$15.00	H	10-50mA	$25.00
PS3	0.2-1bar	$60.00			

Base Model No.	Input	Output	Complete Model No.

Base $ 310.00 + $ + $ = Total $

DT723
THERMOCOUPLE INPUT, ISOLATING, RANGE-SELECTABLE

Base Price $420.00

*Input	Range	Price	Output	Current	Price
FS	Field Selectable	N/C	A	4-20mA	N/C
CA	Custom Calibration (Specify Range)	$20.00	H	10-50mA	N/C

(Field Selectable)

Base Model No.		Input		Output		Complete Model No.
Base $ 420.00	+	$	+	$	=	Total $

*Input is jumper selectable for T/C types J, K, R, S, E from 5-50mV.

MOUNTING HARDWARE

NUMBER	DESCRIPTION	PRICE
DM902	Mounting Plate for DM004 Channel Track	$ 5.00
DM903	Retaining Clip for Securing Two-Wire Transmitter in Explosion-Proof Housing	$ 5.00
DM910	Mounting Plate for Bulk-Head/ Flat Surface Mounting	$10.00
DM930	Mounting Device for Dual Transmitter in High-Dome Explosion-Proof Housing	$20.00
DM004	Four 1-Foot Lengths of Channel Track	$10.00

TWO-WIRE POWER SUPPLIES

NUMBER	DESCRIPTION	PRICE
DP9046	Loop Power Supply (24/40V at 65mA)	$ 95.00
DT609	24V at 600mA Power Supply	$305.00

PRECISION CALIBRATORS

NUMBER	DESCRIPTION	PRICE
474	4 Function RTD Calibrator (PT385, PT392, CU10, Ω)	$ 795.00
477	4 Function Thermocouple Calibrator (K, J, T, mV)	$ 895.00
466T	6 Function Thermocouple Calibrator (J, K, T, R, S, B)	$1595.00
466L	6 mA/mV Thermocouple Calibrator (0-20mA, -10 to +100 mV, J, K, T, E)	$1595.00

PRESSURE SENSORS*

MODEL	DESCRIPTION	PRICE
DA 500	General purpose 50-5000 psig, 20mV/V output; stainless steel	$245.00
DA 501	Low pressure; 0–25 psig; 5mV/V output	$245.00
DA 531	Weld-line Adaptor for DA 500/ 501	$100.00
DA 532	1/4" NPT Adaptor for DA 500/501	$ 50.00
DA 506	Pressure Transmitter 0-15 to 0-2Kpsi Loop-Powered; 4-20mA Output	$495.00

THERMOCOUPLE SENSORS*

MODEL	DESCRIPTION	PRICE
DA 900	6" Straight Probe J,K, T	$ 60.00
DA 901	6" Probe with NPT Thread 3/4"	$ 75.00
DA 902	6" Probe with Compression Filling J,K, T	$ 85.00
DA 905	6" Probe with Junction Head Assembly J,K, T	$130.00

RESISTANCE TEMPERATURE DETECTORS* (100Ω PT)

MODEL**	DESCRIPTION	PRICE
DA 910	6" Straight Probe	$ 90.00
DA 911	6" Probe, 3/4" NPT Threaded	$100.00
DA 912	6" Probe, with Compressions Fitting	$110.00
DA 915	6" Probe with Junction Head Assembly	$190.00

*Wire lengths are 3 feet standard.
**The temperature range on above probes is 250°C (500°F).

HUMIDITY TRANSMITTERS

MODEL	DESCRIPTION	PRICE
DA 800L	Wall Mount Humidity Transmitter, 4-20mA, 0-100% RH	$250.00
DA 801L	Duct Mount Humidity Transmitter, 4-20mA, 0-100% RH	$250.00

RANGING TABLES

The tables on the following pages will help you select "non-standard" ranges for Doric Pac Modules and Two wire Transmitters. The tables list minimum and maximum *acceptable* ranges. To select your custom specified ranges for either input or output, first refer to the **Model Number Range List** on the next page. Then use the appropriate table for your model number.

If your input or output requirements do not fall within the *acceptable* ranges listed in the tables, see the section below on **SPECIAL INPUTS AND OUTPUTS** and consult a Doric Applications Engineer for assistance in placing your order.

SPECIAL INPUTS AND OUTPUTS

The following are conditions that are considered "special inputs and outputs" and require special pricing from the factory.

Voltage Inputs
Offsets from true zero that are greater than selected span; inputs below or above table limits.

Voltage Outputs
Bi-polar outputs; outputs above or below table limits.

Current Inputs
Offsets from zero greater than selected span (4mA, 2mA, 1mA are considered "true zero" for purposes of offset determination). Bi-polar inputs.

Current Outputs
Bi-polar outputs; outputs above or below table limits.

Frequency Inputs
Offsets greater than span; inputs above or below table limits; wave forms other than listed.

Bridge Inputs
Bridge impedance less than 100Ω; Inputs above or below table limits.

RTD Inputs
RTD's other than listed; temperature offset greater than span; Inputs above or below standard N.B.S. tables (Ohmic values must be provided).

T/C Inputs
Thermocouples other than listed; temperature offsets greater than span; inputs above or below standard N.B.S tables (mV values must be provided).

AC Inputs
Inputs above or below table listings.

MINIMUM/ MAXIMUM RANGE TABLES

Models not listed in this table are available in standard ranges only. If you require special ranging information please consult the factory.

MODEL #	TABLE	MODEL #	TABLE	MODEL #	TABLE
DP10__**	A	DP4150	G	DP6010	K
DP12__**	G	DP4151	C	DP6020	K
DP14__**	C	DP4155	M	DP7010	D
DP16__**	K	DP4250	O	DP7050	E
DP17__**	D	DP4300	A	DP7500	L
DP3210**	M	DP4310	B	DP7501	L
DP4001	C	DP4370	A	DP7510	N
DP4003	I	DP4440	A	DP7511	N
DP4010	A	DP4570	A	DT601*	B
DP4041	J	DP4580	A	DT610*	C
DP4050	B	DP4610*	C	DT614*	J
DP4051	F	DP4620*	G	DT621*	G
DP4100	G	DP4630*	I	DT650*	I
DP4101	H	DP4650*	L	DT671*	D
DP4130	G	DP4670*	D		

*Refer to Input Limits Only; Ouputs on these models are 2-wire, 4-20mA/10-50mA Only.
**Refer to Input Limits Only; Outputs on these models are relay Only.

TABLE A	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX OUTPUT	MIN SPAN	MAX INPUT
VOLTAGE	100mV	10V	50mV	250V
CURRENT	1mA	20mA	1mA	1A

TABLE D	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX OUTPUT	MIN SPAN	MAX INPUT
VOLTAGE	100mV	10V	10Hz	10kHz
CURRENT	1mA	20mA		

TABLE B	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX OUTPUT	MIN SPAN	MAX INPUT
VOLTAGE	100mV	10V	10mV	250V
CURRENT	1mA	20mA	100µA	1A

TABLE E	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX OUTPUT	MIN SPAN	MAX INPUT
VOLTAGE	100mV	10V	0.1Hz	50Hz
CURRENT	1mA	20mA		

TABLE C	OUTPUT LIMITS		RTD	MIN SPAN
	MIN SPAN	MAX OUTPUT		
VOLTAGE	100mV	10V	100Ω Pt	40°F (25°C)
			120Ω Ni	20°F (10°C)
CURRENT	1mA	20mA	10Ω Cu	275°F (155°C)
			100Ω Ni	20°F (10°C)

TABLE F	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX INPUT	MIN SPAN	MAX INPUT
VOLTAGE	100mV	10V	2mV/V	250mV/V
CURRENT	1mA	20mA		

TABLE G	OUTPUT LIMITS		T/C TYPE	MIN SPAN
	MIN SPAN	MAX OUTPUT		
VOLTAGE	100mV	10V	J K R S T E C	300°F (185°C) 450°F (250°C) 1720°F (955°C) 1800°F (1000°C) 375°F (210°C) 270°F (150°C) 1000°F (560°C)
CURRENT	1mA	20mA		

TABLE L	INPUT LIMITS		OUTPUT LIMITS	
	MIN SPAN	MAX INPUT	MIN SPAN	MAX OUTPUT
VOLTAGE	200mV	100V	0.15Hz	10kHz
CURRENT	1mA	1A	(0.1-130ppm) for DP7501	

TABLE H	OUTPUT LIMITS		T/C TYPE	MIN SPAN
	MIN SPAN	MAX OUTPUT		
VOLTAGE	100mV	10V	J K R S T E C	170°F (95°C) 220°F (122°C) 990°F (550°C) 1040°F (578°C) 210°F (117°C) 140°F (78°C) 540°F (300°C)
CURRENT	1mA	20mA		

TABLE M	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX OUTPUT	MIN SPAN	MAX INPUT
VOLTAGE	100mV	10V	200mV	100V
CURRENT	1mA	20mA	1mA	1A

TABLE I	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX OUTPUT	MIN SPAN	POT
VOLTAGE	100mV	10V	Any 20% of Pot	100Ω to 10kΩ
CURRENT	1mA	20mA		DP4003 to 100KΩ

TABLE N	OUTPUT LIMITS		INPUT LIMITS
	SCALE FACTOR	MAX OUTPUT	Any frequency up to 100kHz
User adjustable	0.00001 to 0.99999	DP7510-20kHz DP7511-20Hz	Input ≥Output

TABLE J	OUTPUT LIMITS		RTD	MIN Δ SPAN
	MIN SPAN	MAX OUTPUT		
VOLTAGE	100mV	10V	100Ω Pt 120Ω Ni 10Ω Cu 100Ω Ni	4Ω 4Ω 4Ω 4Ω
CURRENT	1mA	20mA		

TABLE O	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX OUTPUT	MIN SPAN	MAX INPUT
VOLTAGE	100mV	10V	3mV	100V
CURRENT	1mA	20mA	100μA	1A

TABLE K	OUTPUT LIMITS		INPUT LIMITS	
	MIN SPAN	MAX OUTPUT	MIN SPAN	MAX INPUT
VOLTAGE	100mV	10V	100mVac	250Vac
CURRENT	1mA	20mA	10mA	5A

EXPLOSION-PROOF HOUSINGS

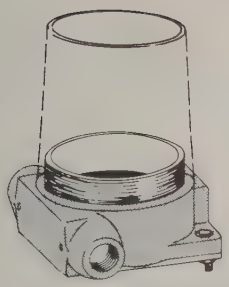
Doric Scientific offers a variety of explosion-proof enclosures for Two-Wire Transmitters. We have Low Dome style tops for single transmitter mountings, and High Dome, glass top style housings for "Piggy Back" style mounting of a digital indicator (DT608 or DT675). All housings are rated as Class I for Groups B, C, D and Class II for Groups E, F, and G.

Note: All DT Series Transmitters (except DT690) intended for mounting in a explosion-proof housing requires a model DM903 retaining spring. Top mounted transmitters in a "Piggy Back" style mounting requires a DM930 top mount retaining device (see "Mounting Hardware").

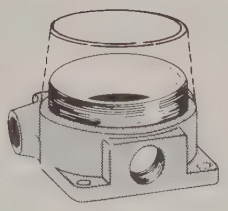
SPECIFICATIONS

	MODEL NUMBER	COVER MATERIAL	COVER HEIGHT	CONDUIT HUBS (QTY)	PRICE
Not for use with DT690 P/I Transmitters	E2LS--	Metal	Low	2	$65.00
	E2LG	Glass	Low	2	$65.00
	E2HS	Metal	High	2	$65.00
	E2HG	Glass	High	2	$63.00
	E3LS	Metal	Low	3	$62.00
	E3LG	Glass	Low	3	$60.00
	E3HS	Metal	High	3	$65.00
	E3HG	Glass	High	3	$62.00
For use only with DT690 P/I transmitters	EP3LS	Metal	Low	2*	$75.00
	EP3HS	Metal	High	2*	$80.00
	EP3HG	Glass	High	2*	$80.00

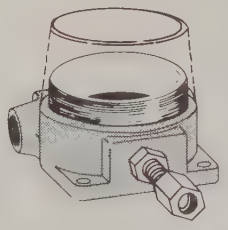
*Third hub is a 1/4" NPT female connection to pneumatic input flame arrestor.



2 Hub Base

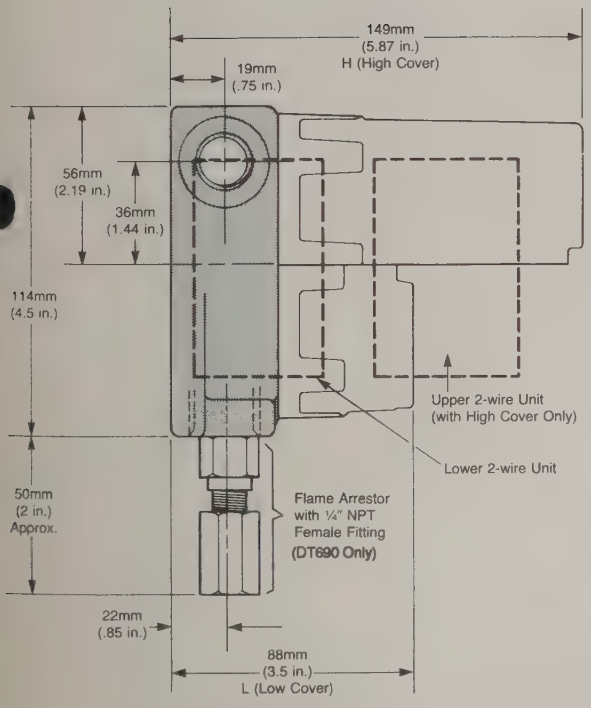


3 Hub Base

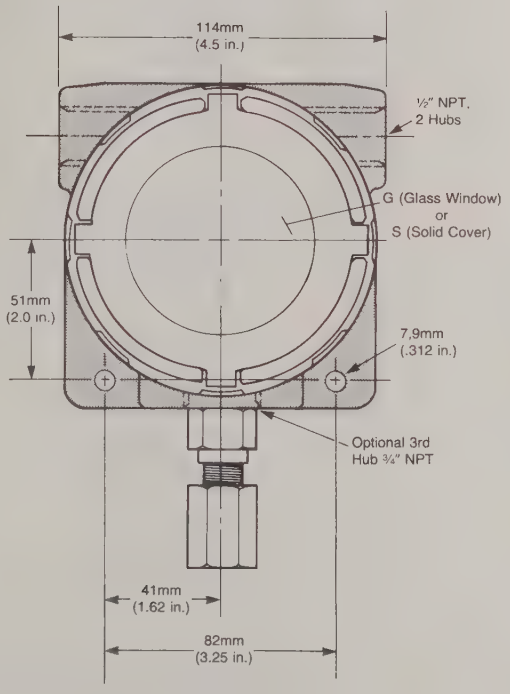


P3 Base

Base with ¼" NPT Pneumatic Input to Flame Arrestor
(DT690 Only)



Side View



Top View

	Base Unit	U.S Price
63A3	3 1/2 digit, Digital Panel Meter, 5 VDC power	$89.
63A1	3 1/2 digit, Digital Panel Meter, 110/220 VAC power	104.
64A3	4 1/2 digit, Digital Panel Meter, 5 VDC power	134.
64A1	4 1/2 digit, Digital Panel Meter, 110/220 VAC power	149.

	Inputs	
–DC	D.C. voltage and current	N/C
–PV	DC scaled process voltage	N/C
–PI	DC scaled process current loop	N/C
-AC	AC voltage and current	39.
-RMS	AC-RMS voltage and current	65.
–T	Thermocouple	65.
–RTD	RTD	75.

	Range	
–V1	199.9 millivolts	N/C
–V2	1.999 volts	N/C
–V3	19.99 volts	N/C
–V4	199.9 volts	N/C
–V5	600 volts	N/C
–I1	199.9 microamps	N/C
–I2	1.999 milliamps	N/C
–I3	19.99 milliamps	N/C
–I4	199.9 milliamps	N/C
–I5	1.999 milliamps	N/C
–I6	5.00 amps	N/C
–V6	1–5 VDC display 0 to 100%	45.
–V7	0–5 VDC display 0 to 100%	45.
–I7	4–20 mA, display 0 to 100%	45.
–SS	Custom Special Scaling (Linear DC voltage & current)	consult factory
–KF	K Thermocouple, °F	N/C
–KC	K Thermocouple, °C	N/C
–JF	J Thermocouple, °F	N/C
–JC	J Thermocouple, °C	N/C
–TF	T Thermocouple, °F	N/C
–T	T Thermocouple, °C	N/C
–EF	E Thermocouple, °F	N/C
–EC	E Thermocouple, °C	N/C
–P1F	RTD Platinum, °F	N/C
–P1C	RTD Platinum, °C	N/C
–P2F	RTD Platinum, 0.1°F	N/C
–P2C	RTD Platinum, 0.1°C	N/C

EXAMPLE

63A1	–T	–KF	Model 63A, 3 1/2 digit, Digital panel meter, 110 VAC power for °F type K thermocouple.

	ACCESSORIES SOLD SEPARATELY	
60A-TBPC	Power Cord	7.00
60A-0W6#	Rack Mount Adapter Plate (For standard 19" W rack, 3.5" H) # Specify number of meters 1,2,3 or 4	45.00

Prices & specification subject to change without notice.

DORIC SCIENTIFIC DIVISION
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San Diego, California 92123-1898

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Cable: AUTOZERO (SAN DIEGO)
FACSIMILE # (619) 2680172

DPDT60/2-87/10M/RP

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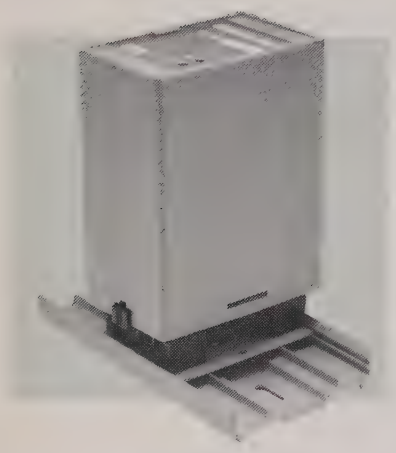
DPDT60/2-87/10M/RP

DORIC DATA

DC Input Limit Alarms
DP1000 through DP1004



OPERATION

The DP1000 Limit Alarm Series accepts a DC current or voltage input and provides a contact closure through a set of DPDT contacts when a user adjustable setpoint level is exceeded.

The input signal is compared to the selected setpoint by a high grade comparator circuit. When the input signal exceeds the setpoint, the comparator circuit commands the DPDT relay to trip (de-energize) indicating an alarm condition. The alarm condition remains until the input falls below the setpoint level. With a latching style limit alarm (designated by an "1L" in the model # eg. 1XXX-X-1L-X) the relay will stay in an alarm condition until manually acknowledged and reset.

CALIBRATION

To adjust **zero**, place the setpoint at its minimum setting. Using a calibrator or other suitable source, apply the minimum specified input level. Adjust the **zero** trim pot until the relay just trips. **Zero** is now set. To adjust the **span** point, place the set point at its maximum. Apply the maximum specified input and adjust the **span** trim pot until the relay just trips. Repeat the **zero** adjustment procedure to check for any interaction between the two controls. **Zero** and **span** trim pots typically afford ±8-10% adjustability of **span**.

OPTIONS

A Option - Adjustable Deadband(0.2-98%)
L Option - "Led" Relay Status Indicator
M Option - Multi-turn Screwdriver Setpoint Adj. (STD. is one turn)
T Option - 0-1V Outputs for Setpoint and Process Indicator
V Option - Replaces Relays with 0/12V Outputs (400 Ω drive)
R Option - Reverses Normal Relay Sense

SPECIFICATIONS

INPUT IMPEDANCE
Voltage
Greater than 1 MΩ
Current
250mv shunt equivalent

SETPOINT RANGE
Setpoint is adjustable over 100% of the input span.

RELAY CONTACTS
Type: Isolated DPDT contact rated 1A @ 120Vac or 28Vdc.
Material:
Silver-Cadmium Oxide
Life:
Electrical: 10^5 operations at rated load.
Mechanical: 10^7 operations.
NOTE: External relay contact protection is required for use with inductive loads.

TRANSMITTER OUTPUT (Option T)
Output Drive
1mA, maximum.
Output Impedance
Less than 1Ω
Linearity(Referenced to Input)
Within 0.05% of span.

RELAY DRIVE VOLTAGE (Option V)
Output Voltage
12Vdc, average.
Output Drive
400 Ω or greater coil impedance

REPEATABILITY
Less than 0.2% of span.

DEADBAND
Fixed deadband 0.25%
(0.2 to 98% with Option A).

RESPONSE TIME
Less than 500 milliseconds.

RESET TIME (Latching models only)
5 seconds.

STABILITY
Temperature:
Better than ±0.015% of span per degree Celsius.

COMMON MODE REJECTION
60 Hz: Greater than 120db.
DC: Greater than 140dB.

OPERATING TEMPERATURE RANGE (Ambient)
Standard Industrial Environment; -5 to 60°C (20 to 140°F).
(Storage: - 20 to 85°C).

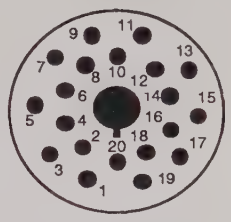
POWER
120Vac ± 10%, 50 to 60Hz, standard.
(100Vac, 120Vac, 240Vac, 24Vdc available.) 2.5 watts typical, watts maximum.

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials and workmanship for a period of ***three years*** commencing with date of shipment to original purchaser.

BOTTOM OF 11-PIN MODULE

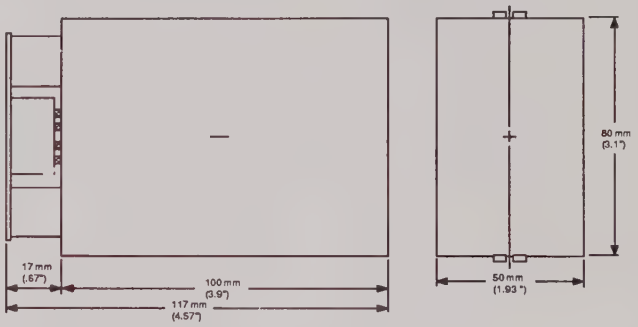


BOTTOM OF 20-PIN MODULE

Socket Mounting Dimensions

Dimension	8-Pin	11-Pin	20-Pin
Mounting Hole-to-Hole	43mm (1.7")	63mm (2.56")	56mm (2.21")
Socket Width	51mm (2.0")	74mm (2.86")	70mm (2.8")
Socket Height	68mm (2.75")	68mm (2.75")	100mm (3.95")

MODULE CASE



DP1000,DP1001, DP1004

PIN CONNECTION
1. AC Power
2. NC
3. AC Power
4. Input +
5. Input -
6. N.O. } Set 1
7. C } Set 1
8. N.C. } Set 1
9. N.O. } Set 2
10. C } Set 2
11. N.C. } Set 2

==========

KEY:
N.O. = Normally Open
C = Common
N.C. = Normally Closed
Proc = Process
Xmtr = Transmitter
CCW = Counterclockwise
W = Wiper
CW = Clockwise
SP = Setpoint

DP1000,DP1001, DP1004 With Option T

PIN CONNECTION
1. AC Power
2. NC
3. AC Power
4. No Connection
5. No Connection
6. No Connection
7. No Connection
8. SP Xmtr +
9. Input +
10. Xmtr Common
11. Input -
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection *
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection *

DP1002

PIN CONNECTION
1. AC Power
2. NC
3. AC Power
4. No Connection
5. SP Pot CCW
6. SP Pot W
7. SP Pot CW
8. No Commection
9. Input +
10. No Connection
11. Input -
12. No Connection
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection *
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection *

DP1002 With Option T

PIN CONNECTION
1. AC Power
2. NC
3. AC Power
4. No Connection
5. SP Pot CCW
6. SP Pot W
7. SP Pot CW
8. SP Xmtr +
9. Input +
10. Xmtr Common
11. Input -
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection *
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection *

DP1003

PIN CONNECTION
1. AC Power
2. NC
3. AC Power
4. No Connection
5. SP -
6. SP +
7. No Connection
8. No Connection
9. Input +
10. No Connection
11. Input -
12. No Connection
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection *
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection *

DP1003 With Option T

PIN CONNECTION
1. AC Power
2. NC
3. AC Power
4. No Connection
5. SP -
6. SP +
7. No Connection
8. SP Xmtr +
9. Input +
10. Xmtr Common
11. Input -
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection *
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection *

*** Pins used for Option V, Voltage Output:**
20pin = 14-,15+,18-,19+
11pin = 7-,8+

SETPOINT POTENTIOMETER = 1kohm

*** Connect pins for contact closure to reset latched relay (designation "1L" in model#)**

DORIC

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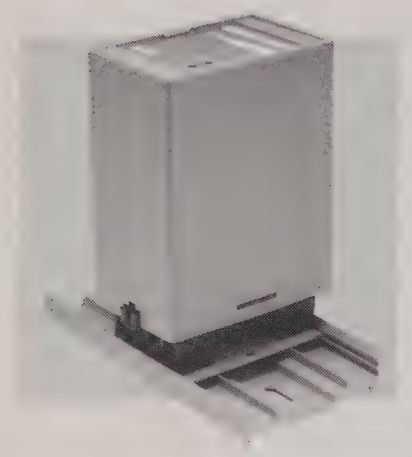
DORIC DATA

DC Input Limit Alarms

DP1020 through DP1024



OPERATION

The DP1020 Limit Alarm Series accepts a DC voltage or current inputs and provides independent contact closure outputs corresponding to user adjustable **Hi** and **Lo** setpoint adjustments.

The input signal is conditioned to a specific DC level and compared against two fully independent setpoint comparator amplifiers, one **Hi** and one **Lo.** If the input signal rises above the **Hi** setpoint, the **Hi** relay energizes, indicating a **Hi** alarm. If the input falls below the **Lo** setpoint, the **Lo** relay energizes. Each relay will return to its normal de-energized state when the input signal returns to within the "normal" preset area as defined by the **Hi** and **Lo** setpoints. With a dual latching style alarm (designated by a "2L" in the model# eg. 1XXX-X-2L-X) when either relay is tripped they will stay latched in an alarm condition until manually reset.

CALIBRATION

To adjust **zero** and **span**, place the **Lo** setpoint at its minimum setting. Place the **Hi** setpoint at its maximum setting. Using a calibrator or other suitable source, apply **zero** level input and adjust the **zero** trim pot until the **Lo** relay just trips. Apply the maximum **span** input and adjust the **span** trim pot until the **Hi** relay trips. **Zero** and **span** trim pots typically afford ±8-10% adjustability of total **span.**

OPTIONS

A Option - Adjustable Deadband (0.2-98%)
L Option - "Led" Relay Status Indicator
M Option - Multi-turn Screwdriver Setpoint Adj. (STD. is one turn)
T Option - 0-1V Outputs for Setpoint and Process Indicator
V Option - Replaces Relays with 0/12V Outputs (400Ω drive)
R Option - Reverses Normal Relay Sense
X Option - Both Relays Trip on Decreasing Input (Lo/Lo function for DP1X2X models only)
Y Option - Both Relays Trip on Increasing Input (Hi/Hi alarm function)

SPECIFICATIONS

INPUT IMPEDANCE
Voltage
Greater than 1MΩ
Current
250mv shunt equivalent.

SETPOINT RANGE
Setpoint is adjustable over 100% of the input span.

RELAY CONTACTS
Type: Isolated SPDT contacts rated 1A @ 120Vac or 28Vdc
Material:
Silver-Cadmium Oxide
Life:
Electrical: 10^5 operations at rated load.
Mechanical: 10^7 operations.
NOTE: External relay contact protection is required for use with inductive loads.

TRANSMITTER OUTPUTS (Option T)
Output Drive
1mA, maximum.
Output impedance
Less than 1Ω.
Linearity (Referenced to Input)
Within 0.05% of span.

RELAY DRIVE VOLTAGE (Option V)
Output Voltage
12Vdc, average
Output Drive
Drives 400Ω or greater coil impedance.

REPEATABILITY
Less than 0.2% of span.

DEADBAND
Fixed deadband 0.25%
(0.2 to 98% with Option A)

RESPONSE TIME
Less than 500 milliseconds.

RESET TIME (Latching models only)
5 seconds.

STABILITY
Temperature:
Better than ±0.015% of span per degree Celsius.

COMMON MODE REJECTION
60 Hz: Greater than 120db.
DC: Greater than 140db.

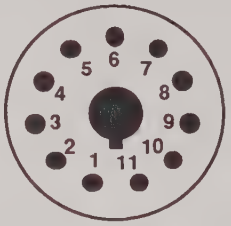
OPERATING TEMPERATURE RANGE (Ambient)
Standard Industrial Environment, -5 to 60°C (20 to 140°F)
(Storage: -20 to 85°C)

POWER
120Vac ± 10%, 50 to 60Hz, standard.
(100Vac, 120Vac, 240Vac, 24Vdc available). 2.5 Watts typical, 4 Watts maximum.

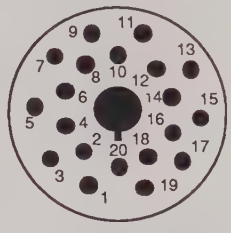
Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defects in parts, materials and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.



BOTTOM OF 11-PIN MODULE

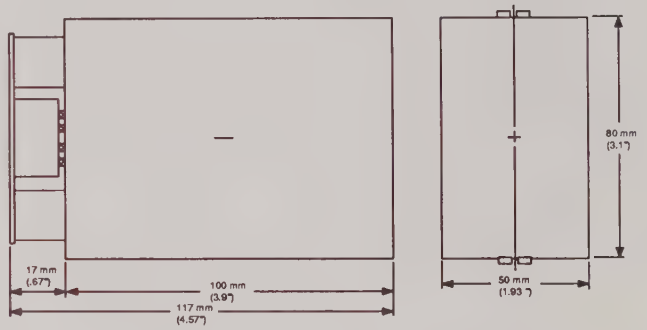


BOTTOM OF 20-PIN MODULE

Socket Mounting Dimensions

Dimensions	8-Pin	11-Pin	20-Pin
Mounting Hole-to-Hole	43mm (1.7")	63mm (2.56")	56mm (2.21")
Socket Width	51mm (2.0")	74mm (2.86")	70mm (2.8")
Socket Height	17mm (0.67")	17mm (0.67")	33mm (1.25")

MODULE CASE



DP1020,DP1021, DP1024

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. Input +
5. Input -
6. N.O. } Hi Set
7. C } Hi Set
8. N.C. } Hi Set
9. N.O. } Lo Set
10. C } Lo Set
11. N.C. } Lo Set

==========

KEY:

N.O. = Normally Open
C = Common
N.C. = Normally Closed
Proc = Process
Xmtr = Transmitter
CCW = Counterclockwise
W = Wiper
CW = Clockwise
SP = Setpoint

DP1020,DP1021, DP1024 With Option T

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. No Connection
5. No Connection
6. No Connection
7. No Connection
8. No Connection
9. Input +
10. Proc Xmtr +
11. Input -
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

*** Pins used for Option V, Voltage Output:**

20pin: Hi Set = 18-,19+
Lo Set = 14-,15+
11pin: Hi Set = 7+,8-
Lo Set = 10+,11-

DP1022

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. Lo SP Pot CW
5. Lo SP Pot W
6. SP Pot CCW
7. Hi SP Pot W
8. Hi SP Pot CW
9. Input +
10. No Connection
11. Input -
12. No Connection
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. No Connection
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. No Connection

DP1022 With Option T

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. Lo SP Pot CW
5. Lo SP Pot W
6. SP Pot CCW
7. Hi SP pot W
8. Hi SP Pot CW
9. Input +
10. Proc Xmtr +
11. Input -
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

DP1023

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. No Connection
5. Lo SP +
6. SP Common
7. Hi SP +
8. No Connection
9. Input +
10. No Connection
11. Input -
12. No Connection
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. No Connection
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. No Connection

DP1023 With Option T

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. No Connection
5. Lo SP +
6. SP Common
7. Hi SP +
8. No Connection
9. Input +
10. Proc Xmtr +
11. Input -
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

SETPOINT POTENTIOMETER = 1kΩ

*** Remove line power to reset latched relay (designation "2L" in model#)**

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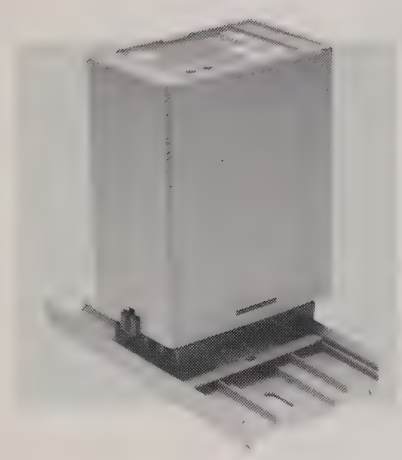
Thermocouple Limit Alarms

DP1200 through DP1204



OPERATION

The DP 1200 Limit Alarm Series accepts a Thermocouple Input and provides a contact closure through one set of DPDT contacts when a user adjustable setpoint level is exceeded. All 1200 Series Limit Alarms incorporate fast tracking cold-junction compensation networks and up-scale Thermocouple break detect (up-scale burnout) as standard functions.

The input signal is compared to the selected setpoint by a high grade comparator circuit. When the input signal exceeds the setpoint, the comparator circuit commands the DPDT relay to trip (de-energize) indicating an alarm condition. The alarm condition remains until the input falls below the setpoint level. With a latching style limit alarm (designated by an "1L" in the model# eg. 1XXX-X-1L-X) the relay will stay in an alarm condition until manually acknowledged and reset.

CALIBRATION

To adjust **zero**, place the setpoint at its maximum setting. Using a calibrator or other suitable source, apply the minimum specified input level. Adjust the **zero** trim pot until the relay just trips. **Zero** is now set. To adjust the **span** point, place the setpoint at its maximum. Apply the maximum specified input and adjust the **span** trim pot until the relay just trips. Repeat the **zero** adjustment procedure to check for any interaction between the two controls. **Zero** and **Span** trim pots typi-cally afford ±8-10% adjustability of **span.**

OPTIONS

A Option - Adjustable Deadband(0.2-98%)
B Option - "Led" Relay Status Indicator
L Option - Multi-turn screwdriver setpoint adj. (STD. is one touch)
T Option - 0-1V outputs for setpoint and process indication
V Option - Replaces relays with 0/12V outputs (400-Drive)
R Option -Reverses normal relay sense

SPECIFICATIONS

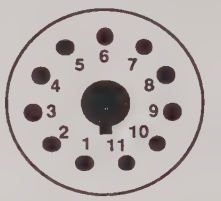
INPUT IMPEDANCE
Greater than 1 MΩ.
INPUT THERMOCOUPLE TYPES
All ansi type Thermocouples B,C,D,E,G,J,K,N,R,S,T (6mv Spans minimum)
INPUT BIAS CURRENT
Less than or equal to 1μ a.
SETPOINT RANGE
Setpoint is adjustable over 100% of the input span.
RELAY CONTACTS
Type: Isolated DPDT contacts, rated 1A @ 120Vac or 28Vdc.
Material: Silver-Cadmium Oxide
Life:
Electrical: 10^5 operations at rated load.
Mechanical: 10^7 operations.
NOTE: External relay contact protection is required for use with inductive loads.
TRANSMITTER OUTPUT (Option T)
Output Drive
1mA, maximum
Output Impedance
Less than 1 Ω.
Linearity (Referenced to Input)
Within 0.05% of span.

RELAY DRIVE VOLTAGE (Option V)
Output Voltage
12Vdc, average.
Output Drive
Drives 400 Ωs or greater coil impedance.
REPEATABILITY
Less than 0.2% of Span.
DEADBAND
Fixed Deadband 0.25% (0.2 to 98% with Option A)
RESPONSE TIME
Less than 500 milliseconds.
RESET TIME(Latching model only)
5 seconds.
STABILITY
Temperature:
Better than ±0.015% of span per degree of Celsius.
COMMON MODE REJECTION
60 Hz: Greater than 120db.
DC: Greater than 140dB.
OPERATING TEMPERATURE RANGE (Ambient)
Standard Industrial Environment; -5 to 60 °C (20 to 140 °F).
(Storage: - 20 to 85°C.)
POWER
120Vac ± 10%, 50 to 60Hz standard.
(100Vac, 120Vac, 240Vac, 24Vdc available.) 2.5 Watts typical, 4 Watts maximum.

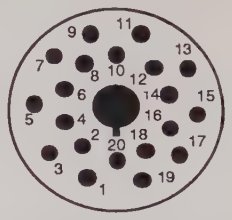
Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials and workmanship for a period of ***three years*** commencing with date of shipment to original purchaser.



BOTTOM OF 11-PIN MODULE

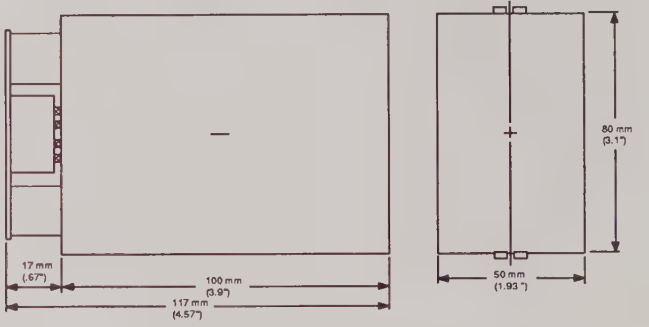


BOTTOM OF 20-PIN MODULE

Socket Mounting Dimensions

Dimension	8-Pin	11-Pin	20-Pin
Mounting Hole-to-Hole	43mm (1.7")	63mm (2.56")	56mm (2.21")
Socket Width	51mm (2.0")	74mm (2.86")	70mm (2.8")
Socket Height	68mm (2.75")	68mm (2.75")	100mm (3.95")

MODULE CASE



(2) DP1200, DP1201, DP1204

PIN	CONNECTION
1.	AC Power
2.	NC
3.	AC Power
4.	Input +
5.	Input -
6.	N.O. } Set 1
7.	C } Set 1
8.	N.C. } Set 1
9.	N.O. } Set 2
10.	C } Set 2
11.	N.C. } Set 2

KEY:
N.O. = Normally Open
C = Common
N.C. = Normally Closed
Proc = Process
Xmtr = Transmitter
CCW = Counterclockwise
W = Wiper
CW = Clockwise
SP = Setpoint

DP1200, DP1201, DP1204

PIN	CONNECTION
1	AC Power
2.	NC
3.	AC Power
4.	No Connection
5.	No Connection
6.	No Connection
7.	No Connection
8.	SP Xmtr +
9.	Input +
10.	Xmtr Common
11.	Input -
12.	Proc Xmtr +
13.	N.O. } Set 1
14.	C } Set 1
15.	N.C. } Set 1
16.	No Connection *
17.	N.O. } Set 2
18.	C } Set 2
19.	N.C. } Set 2
20.	No Connection *

DP1202

PIN	CONNECTION
1.	AC Power
2.	NC
3.	AC Power
4.	No Connection
5.	SP Pot CCW
6.	SP Pot W
7.	SP Pot CW
8.	No Commection
9.	Input +
10.	No Connection
11.	Input -
12.	No Connection
13.	N.O. } Set 1
14.	C } Set 1
15.	N.C. } Set 1
16.	No Connection *
17.	N.O. } Set 2
18.	C } Set 2
19.	N.C. } Set 2
20.	No Connection *

DP1202 With Option T

PIN	CONNECTION
1.	AC Power
2.	NC
3.	AC Power
4.	No Connection
5.	SP Pot CCW
6.	SP Pot W
7.	SP Pot CW
8.	SP Xmtr +
9.	Input +
10.	Xmtr Common
11.	Input -
12.	Proc Xmtr +
13.	N.O. } Set 1
14.	C } Set 1
15.	N.C. } Set 1
16.	No Connection *
17.	N.O. } Set 2
18.	C } Set 2
19.	N.C. } Set 2
20.	No Connection *

DP1203

PIN	CONNECTION
1.	AC Power
2.	NC
3.	AC Power
4.	No Connection
5.	SP -
6.	SP +
7.	No Connection
8.	No Connection
9.	Input +
10.	No Connection
11.	Input -
12.	No Connection
13.	N.O. } Set 1
14.	C } Set 1
15.	N.C. } Set 1
16.	No Connection *
17.	N.O. } Set 2
18.	C } Set 2
19.	N.C. } Set 2
20.	No Connection *

DP1203 With Option T

PIN	CONNECTION
1.	AC Power
2.	NC
3.	AC Power
4.	No Connection
5.	SP -
6.	SP +
7.	No Connection
8.	SP Xmtr +
9.	Input +
10.	Xmtr Common
11.	Input -
12.	Proc Xmtr +
13.	N.O. } Set 1
14.	C } Set 1
15.	N.C. } Set 1
16.	No Connection *
17.	N.O. } Set 2
18.	C } Set 2
19.	N.C. } Set 2
20.	No Connection *

*** Pins used for Option V, Voltage Output:**
20pin = 14-,15+,18-,19+
11pin = 7-,8+

SETPOINT POTENTIOMETER = 1 kΩ

*** Connect pins for contact closure to reset latched relay (designation "1L" in model#)**

(2) For model 1200,1201,1204 with latching relays ("1L" in model#) use 20pin "T" Option hook-up

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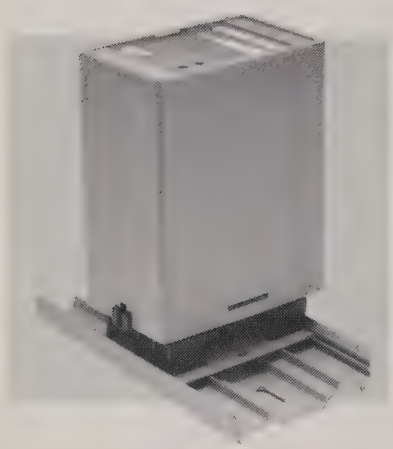
Thermocouple Limit Alarms
DP1220 through DP1224



OPERATION

The DP1220 Limit Alarm Series accepts a thermocouple input and provides independent contact closure outputs corresponding to user adjustable **Hi** and **Lo** setpoint adjustments. All 1220 series limit alarms incorporate fast tracking cold-junction compensation networks and up-scale break detect (up-scale burnout) as standard features.

The input signal is conditioned to a specific DC level and compared against two fully independent setpoint comparator amplifiers, one **Hi** and one **Lo.** If the input signal rises above the **Hi** setpoint, the **Hi** relay energizes, indicating a **Hi** alarm. If the input falls below the **Lo** setpoint, the **Lo** relay energizes. Each relay will return to its normal de-energized state when the input signal returns to within the "normal" preset area as defined by the **Hi** and **Lo** setpoints. With a dual latching style alarm (designated by a "2L" in the model# eg. 1XXX-X-2L-X) when either relay is tripped they will stay latched in an alarm condition until manually reset.

CALIBRATION

To adjust **zero** and **span**, place the **Lo** setpoint at its minimum setting. Place the **Hi** setpoint at its maximum setting. Using a calibrator or other suitable source, apply **zero** level input and adjust the **zero** trim pot until the **Lo** relay just trips. Apply the maximum **span** input and adjust the **span** trim pot until the **Hi** relay trips. **Zero** and **span** trim pots typically afford ±8-10% adjustability of total **span.**

OPTIONS

A Option - Adjustable Deadband (0.2-98%)
L Option - "Led" Relay Status Indicator
M Option - Multi-turn Screwdriver Setpoint Adj. (STD. is one turn)
T Option - 0-1V Outputs for Setpoint and Process Indicator
V Option - Replaces Relays with 0/12V Outputs (400Ω drive)
R Option - Reverses Normal Relay Sense
X Option - Both Relays Trip on Decreasing Input (Lo/Lo function for DP1X2X models only)
Y Option - Both Relays Trip on Increasing Input (Hi/Hi alarm function)

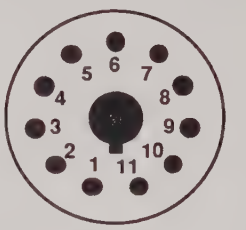
SPECIFICATIONS

INPUT IMPEDANCE
Greater than 1MΩ.
INPUT THERMOCOUPLE TYPES
All ansi type Thermocouples B,C,D,E,G,J,K,N,R,S,T (6mv Spans minimum)
SETPOINT RANGE
Setpoint is adjustable over 100% of the input span.
RELAY CONTACTS
Type: Isolated SPDT contacts rated 1A @ 120Vac or 28Vdc
Material: Silver-Cadmium Oxide
Life: Electrical: 10^5 operations at rated load. Mechanical: 10^7 operations.
NOTE: External relay contact protection is required for use with inductive loads.
TRANSMITTER OUTPUTS (Option T)
Output Drive 1mA, maximum.
Output impedance Less than 1Ω.
Linearity (Referenced to Input) Within 0.05% of span.
RELAY DRIVE VOLTAGE (Option V)
Output Voltage 12Vdc, average
Output Drive Drives 400Ω or greater coil impedance.
REPEATABILITY
Less than 0.2% of span.
DEADBAND
Fixed deadband 0.25% (0.2 to 98% with Option A)
RESPONSE TIME
Less than 500 milliseconds.
RESET TIME (Latching models only)
5 seconds.
STABILITY
Temperature: Better than ±0.015% of span per degree Celsius.
COMMON MODE REJECTION
60 Hz: Greater than 120db.
DC: Greater than 140db.
OPERATING TEMPERATURE RANGE (Ambient)
Standard Industrial Environment, -5 to 60°C (20 to 140°F)
(Storage: -20 to 85°C)
POWER
120Vac ± 10%, 50 to 60Hz, standard.
(100Vac, 120Vac, 240Vac, 24Vdc available). 2.5 Watts typical, 4 Watts maximum.

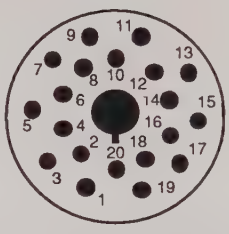
Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defects in parts, materials and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.



BOTTOM OF 11-PIN MODULE

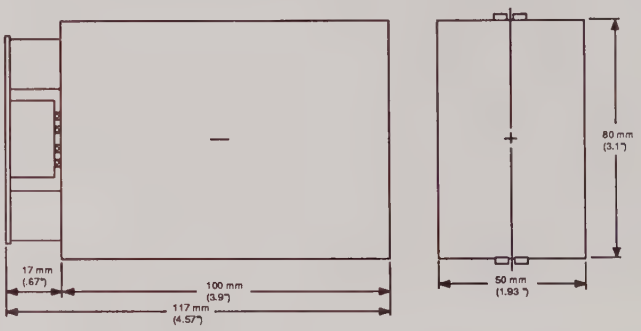


BOTTOM OF 20-PIN MODULE

Socket Mounting Dimensions

Dimensions	8-Pin	11-Pin	20-Pin
Mounting Hole-to-Hole	43mm (1.7")	63mm (2.56")	56mm (2.21")
Socket Width	51mm (2.0")	74mm (2.86")	70mm (2.8")
Socket Height	68mm (2.75")	68mm (2.75")	100mm (3.95")

MODULE CASE



DP1220,DP1221, DP1224

PIN CONNECTION

1. AC Power*
2. NC
3. AC Power
4. Input +
5. Input -
6. N.O. } Hi Set
7. C } Hi Set
8. N.C. } Hi Set
9. N.O. } Lo Set
10. C } Lo Set
11. N.C. } Lo Set

KEY:

N.O. = Normally Open
C = Common
N.C. = Normally Closed
Proc = Process
Xmtr = Transmitter
CCW = Counterclockwise
W = Wiper
CW = Clockwise
SP = Setpoint

DP1220,DP1221, DP1224 With Option T

PIN CONNECTION

1. AC Power*
2. NC
3. AC Power
4. No Connection
5. No Connection
6. No Connection
7. No Connection
8. No Connection
9. Input +
10. Proc Xmtr +
11. Input -
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

*** Pins used for Option V, Voltage Output:**
20pin: Lo Set = 14-,15+
Hi Set = 18+,19-
11pin: Lo Set = 10+,11-
Hi Set = 7+,8-

DP1222

PIN CONNECTION

1. AC Power*
2. NC
3. AC Power
4. Lo SP Pot CW
5. Lo SP Pot W
6. SP Pot CCW
7. Hi SP Pot W
8. Hi SP Pot CW
9. Input +
10. No Connection
11. Input -
12. No Connection
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. No Connection
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. No Connection

DP1222 With Option T

PIN CONNECTION

1. AC Power*
2. NC
3. AC Power
4. Lo SP Pot CW
5. Lo SP Pot W
6. SP Pot CCW
7. Hi SP pot W
8. Hi SP Pot CW
9. Input +
10. Proc Xmtr +
11. Input -
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

SETPOINT POTENTIOMETER = 1kΩ

*** Disconnect AC power to reset latched relay (designation "2L" in model#)**

DP1223

PIN CONNECTION

1. AC Power*
2. NC
3. AC Power
4. No Connection
5. Lo SP +
6. SP Common
7. Hi SP +
8. No Connection
9. Input +
10. No Connection
11. Input -
12. No Connection
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. No Connection
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. No Connection

DP1223 With Option T

PIN CONNECTION

1. AC Power*
2. NC
3. AC Power
4. No Connection
5. Lo SP +
6. SP Common
7. Hi SP +
8. No Connection
9. Input +
10. Proc Xmtr +
11. Input -
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

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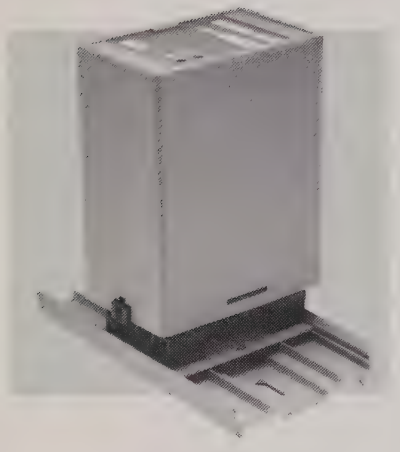
RTD Input Limit Alarms

DP1400 through DP1404



OPERATION

The DP1400 Limit Alarm Series accepts an RTD (Resistance Temperature Device) input and provides a contact closure through a set of DPDT contacts when a user adjustable setpoint level is exceeded. Two, three and four wire input devices can be accomodated with the DP1400 series providing various types of lead length compensation.

The input signal is compared to the selected setpoint by a high grade comparator circuit. When the input signal exceeds the setpoint, the comparator circuit commands the DPDT relay to trip (de-energize) indicating an alarm condition. The alarm condition remains until the input falls below the setpoint level. With a latching style limit alarm (designated by a "1L" in the model# eg. 1XXX-X-1L-X) the relay will stay in an alarm condition until manually acknowledged and reset.

CALIBRATION

To adjust **zero**, place the setpoint at its minimum setting. Using a calibrator, or other suitable source, apply the minimum specified input level. Adjust **zero** trim pot until the relay just trips. **Zero** is now set. To adjust the **span** point, place the setpoint at its maximum. Apply the maximum specified input and adjust the **span** trim pot until the relay just trips. Repeat the **zero** adjustment procedure to check for any interaction between the two controls. **Zero** and **span** trim pots typically afford ±8-10% adjustability of **span**.

OPTIONS

A Option - Adjustable Deadband (0.2-98%)
L Option - "Led" Relay Status Indicator
M Option - Multi-turn Screwdriver Setpoint Adj. (STD. is one turn)
T Option - 0-1V Outputs for Setpoint and Process Indicator
V Option - Replaces Relays with 0/12V Outputs (400Ω drive)
R Option - Reverses Normal Relay Sense

SPECIFICATIONS

RTD EXCITATION CURRENT (Maximum)
100Ω Pt: 5mA.
500Ω Pt: 2mA.
120Ω Pt: 5mA.
10Ω Pt: 10mA.

MAXIMUM LEADWIRE RESISTANCE (Per LEad)
100Ω Pt: 30Ωs.
500Ω Pt: 100Ωs.
120Ω Ni: 30Ωs.
10Ω Cu: 10Ωs.

LEADWIRE EFFECT
Less than 1% of span over entire leadwire resistance range.

INPUT PROTECTION
Normal Mode
Withstands ±5Vdc.
Common Mode
600Vdc or 300Vac, input to ground.

SETPOINT RANGE
Setpoint is adjustable over 100% of the input span.

RELAY CONTACTS
Type: Isolated DPDT contacts, rated 1A @ 120Vac or 28Vac,
Material: Silver-Cadmium Oxide.
Life:
Electrical: 10^5 operations at rated load.
Mechanical: 10^7 operations.
NOTE: External relay contact protection is required for inductive load.

REPEATABILITY
Less than 0.2% of span.

TRANSMITTER OUTPUT (Option T)
Output Drive
1mA, maximum.
Output Impedance
Less than 1Ω.
Linearity (Referenced to Input)
Within 0.05% of span.

RELAY DRIVE VOLTAGE (Option V)
Output Voltage
12Vdc, average.
Output Drive
Drives 400Ωs or greater coil impedance.

DEADBAND
Fixed deadband 0.25%
(0.2 to 98% with Option A)

RESPONSE TIME
Less than 500 milliseconds.

RESET TIME (Latching models only)
5 seconds.

STABILITY
Temperature
Better than 0.015% of span per degree Celsius.

COMMON MODE REJECTION
60Hz: Greaater than 120db.
DC: Greater than 140dB.

OPERATING TEMPERATURE RANGE (Ambient)
Standard Industrial Environment, -5 to 60°C (20 to 140°F)
(Storage: -20 to 85°C)

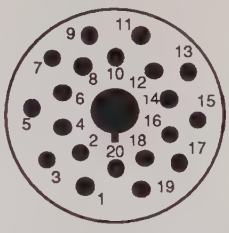
POWER
120Vac ± 10%, 50 to 60Hz, standard. (100Vac, 120Vac, 240Vac, 24Vdc available) 2.5 Watts typical, 4 Watts maximum.

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defects in parts, materials and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

BOTTOM OF 11-PIN MODULE

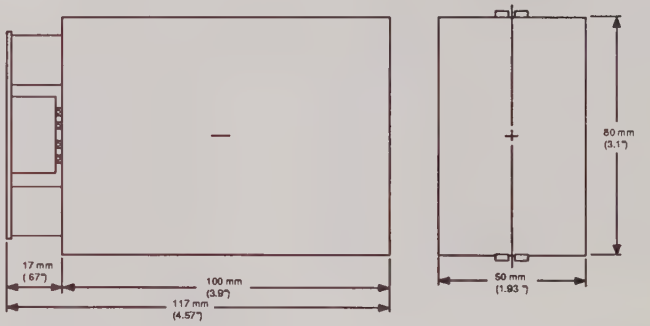


BOTTOM OF 20-PIN MODULE

Socket Mounting Dimensions

Dimensions	8-Pin	11-Pin	20-Pin
Mounting Hole-to-Hole	43mm (1.7")	63mm (2.56")	56mm (2.21")
Socket Width	51mm (2.0")	74mm (2.86")	70mm (2.8")
Socket Height	17mm (0.67")	17mm (0.67")	33mm (1.25")

MODULE CASE



DP1400,DP1401, DP1404 With Option T

PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. No Connection*
5. No Connection
6. No Connection
7. No Connection
8. SP Xmtr +
9. RTD Lo
10. Xmtr Common
11. RTD Hi
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection*
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. RTD Comp Lead

DP1402 With Option T

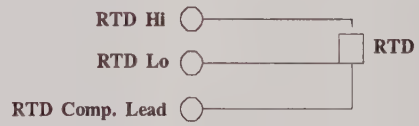
PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. No Connection*
5. SP Pot CCW
6. SP Pot W
7. SP Pot CW
8. SP Xmtr +
9. RTD Lo
10. Xmtr Common
11. RTD Hi
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection*
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. RTD Comp Lead

DP1404 With Option T

PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. No Connection*
5. SP -
6. SP +
7. No Connection
8. SP Xmtr +
9. RTD Lo
10. Xmtr Common
11. RTD Hi
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection*
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. RTD Comp Lead



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KEY:

N.O. = Normally Open
C = Common
N.C. = Normally Closed
Proc = Process
Xmtr = Transmitter
CCW = Counterclockwise
W = Wiper
CW = Clockwise
SP = Setpoint

*** Pins used for Option V, Voltage Output:**
Set 1 = 14+,15-
Set 2 = 18+,19-

SETPOINT POTENTIOMETER = 1kΩ

*** Connect pins for contact closure to reset latched relay (designation "1L" in model#)**

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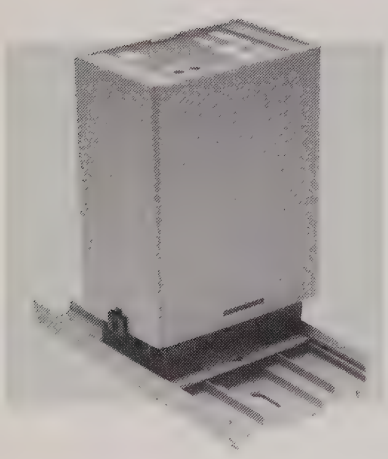
RTD Input Limit Alarms

DP1420 through DP1424



OPERATION

The DP1420 Limit Alarm Series accepts an RTD (Resistance Temperature Device) as input and provides independent contact closure outputs corresponding to user adjustable **Hi** and **Lo** setpoint adjustments.

The input signal is conditioned to a specific DC level and compared against two fully independent setpoint comparator amplifiers, one **Hi** and one **Lo.** If the input signal rises above the **Hi** setpoint, the **Hi** relay energizes, indicating a **Hi** alarm. If the input falls below the **Lo** setpoint, the **Lo** relay energizes. Each relay will return to its normal de-energized state when the input signal returns to within the "normal" preset area as defined by the **Hi** and **Lo** setpoints. With a dual latching style alarm (designated by a "2L" in the model# eg. 1XXX-X-2L-X) when either relay is tripped they will stay latched in an alarm condition until manually reset.

CALIBRATION

To adjust **zero** and **span,** place the **Lo** setpoint at its minimum setting. Place the **Hi** setpoint at its maximum setting. Using a calibrator or other suitable source, apply **zero** level input and adjust the **zero** trim pot until the **Lo** relay just trips. Apply the maximum **span** input and adjust the **span** trim pot until the **Hi** relay trips. **Zero** and **span** trim pots typically afford ±8-10% adjustability of total **span.**

OPTIONS

A Option - Adjustable Deadband (0.2-98%)
L Option - "Led" Relay Status Indicator
M Option - Multi-turn Screwdriver Setpoint Adj. (STD. is one turn)
T Option - 0-1V Outputs for Setpoint and Process Indicator
V Option - Replaces Relays with 0/12V Outputs (400Ω drive)
R Option - Reverses Normal Relay Sense
X Option - Both Relays Trip on Decreasing Input (lo/Lo function for DP1X2X models only)
Y Option - Both Relays Trip on Increasing Input (Hi/Hi alarm function)

SPECIFICATIONS

RTD EXCITATION CURRENT (Maximum)
100Ω Pt: 5mA.
500Ω Pt: 2mA.
120Ω Pt: 5mA.
10Ω Pt: 10mA.

MAXIMUM LEADWIRE RESISTANCE (Per LEad)
100Ω Pt: 30Ωs.
500Ω Pt: 100Ωs.
120Ω Ni: 30Ωs.
10Ω Cu: 10Ωs.

LEADWIRE EFFECT
Less than 1% of span over entire leadwire resistance range.

INPUT PROTECTION
Normal Mode
Withstands ±5Vdc.
Common Mode
600Vdc or 300Vac, input to ground.

SETPOINT RANGE
Setpoint is adjustable over 100% of the input span.

RELAY CONTACTS
Type: Isolated SPDT contacts, rated 1A @ 120Vac or 28Vac,
Material: Silver-Cadmium Oxide.
Life:
Electrical: 10^5 operations at rated load.
Mechanical: 10^7 operations.
NOTE: External relay contact protection is required for inductive load.

REPEATABILITY
Less than 0.2% of span.

TRANSMITTER OUTPUT (Option T)
Output Drive
1mA, maximum.
Output Impedance
Less than 1Ω.
Linearity (Referenced to Input)
Within 0.05% of span.

RELAY DRIVE VOLTAGE (Option V)
Output Voltage
12Vdc, average.
Output Drive
Drives 400Ωs or greater coil impedance.

DEADBAND
Fixed deadband 0.25%
(0.2 to 98% with Option A)

RESPONSE TIME
Less than 500 milliseconds.

RESET TIME (Latching models only)
5 seconds.

STABILITY
Temperature
Better than 0.015% of span per degree Celsius.

COMMON MODE REJECTION
60Hz: Greaater than 120db.
DC: Greater than 140dB.

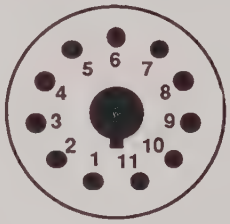
OPERATING TEMPERATURE RANGE (Ambient)
Standard Industrial Environment, -5 to 60°C (20 to 140°F)
(Storage: -20 to 85°C)

POWER
120Vac ± 10%, 50 to 60Hz, standard. (100Vac, 120Vac, 240Vac, 24Vdc available) 2.5 Watts typical, 4 Watts maximum.

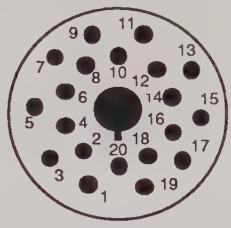
Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defects in parts, materials and workmanship for a period of *three years* commencing with the date of shipment to the original purchaser.



BOTTOM OF 11-PIN MODULE

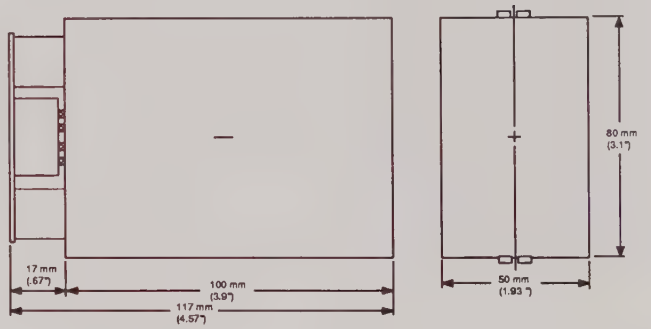


BOTTOM OF 20-PIN MODULE

Socket Mounting Dimensions

Dimensions	8-Pin	11-Pin	20-Pin
Mounting Hole-to-Hole	43mm (1.7")	63mm (2.56")	56mm (2.21")
Socket Width	51mm (2.0")	74mm (2.86")	70mm (2.8")
Socket Height	17mm (0.67")	17mm (0.67")	33mm (1.25")

MODULE CASE



DP1420,DP1421, DP1424 With Option T

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. No Connection
5. No Connection
6. Xmtr Common
7. No Connection
8. No Connection
9. RTD Lo
10. Proc Xmtr +
11. RTD Hi
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. RTD Comp Lead

DP1422 With Option T

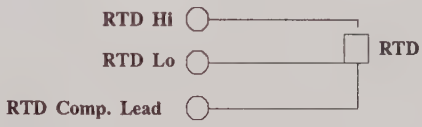
PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. Lo SP Pot CW
5. Lo SP Pot W
6. SP Pot CCW
7. Hi SP Pot W
8. Hi SP Pot CW
9. RTD Lo
10. Proc Xmtr +
11. RTD Hi
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. RTD Comp Lead

DP1423 With Option T

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. No Connection
5. Lo SP +
6. SP Common
7. Hi SP +
8. No Connection
9. RTD Lo
10. Proc Xmtr +
11. RTD Hi
12. Lo SP Xmtr
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. RTD Comp Lead



*** Pins used for Option V, Voltage Output:**
Lo Set = 14+,15-
Hi Set = 18+,19-

*** SETPOINT POTENTIOMETER = 1kΩ**

*** Remove line power to reset latched relay (designation "2L" in model#)**

KEY:

N.O. = Normally Open
C = Common
N.C. = Normally Closed
Proc = Process
Xmtr = Transmitter
CCW = Counterclockwise
W = Wiper
CW = Clockwise
SP = Setpoint

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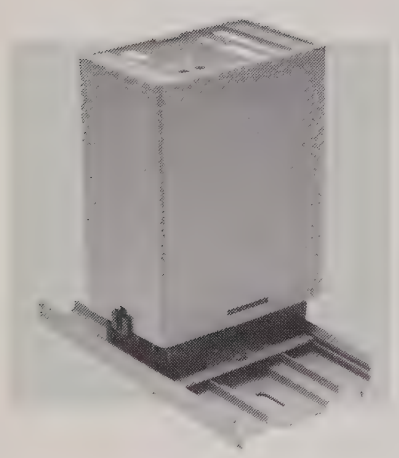
AC Input Limit Alarms

DP1600 through DP1604



OPERATION

The DP1600 Limit Alarm Series accepts an AC voltage or AC current input and provides a contact closure with a DPDT relay when the input exceeds a predefined, user adjustable setpoint.

The input signal is compared to the selected setpoint by a high grade conparator circuit. When the input signal exceeds the setpoint, the comparator circuit commands the DPDT relay to trip (de-energize), indicating an alarm condition. The alarm condition remains until the input falls below the setpoint level. With a latching style limit alarm (designated by a "1L" in the model# eg. 1XXX-X-1L-X) the relay will stay in an alarm condition until manually acknowledged and reset.

CALIBRATION

To adjust **zero**, place the setpoint at its minimum setting. Using a calibrator or other suitable source, apply the minimum specified input level. Adjust the **zero** trim pot until the relay just trips. **Zero** is now set. To adjust the **span** point, place the setpoint at its maximum. Apply the maximum specified input and adjust the **span** trim pot until the relay just trips. Repeat the **zero** adjustment procedure to check for any interaction between the two controls. **Zero** and **span** trim pots typically afford ±8-10% adjustability of **span**.

OPTIONS

A Option - Adjustable Deadband (0.2-98%)
L Option - "Led" Relay Status Indicator
M Option - Multi-turn Screwdriver Setpoint Adj. (STD. is one turn)
T Option - 0-1V Outputs for Setpoint and Process Indicator
V Option - Replaces Relays with 0/12V Outputs (400Ω drive)
R Option - Reverses Normal Relay Sense

SPECIFICATIONS

INPUT IMPEDANCE
Voltage
Greater than 200kΩ
Current
500mvac shunt equivalent

INPUT CAPABILITY
Voltage
100mvac to 250vac
Current
100mA to 5amps

SETPOINT RANGE
Setpoint is adjustable over 100% of the input span.

RELAY CONTACTS
Type: Isolated DPDT contacts rated 1A @ 120Vac or 28Vdc
Material:
Silver-Cadium Oxide
Life:
Electrical: 10^5 operations at rated load.
Mechanical: 10^7 operations.
NOTE: External relay contact protection is required for use with inductive loads.

TRANSMITTER OUTPUTS (Option T)
Output Drive
1mA, maximum.
Output impedance
Less than 1Ω.
Linearity (Referenced to Input)
Within 0.05% of span.

RELAY DRIVE VOLTAGE (Option V)
Output Voltage
12Vdc, average
Output Drive
Drives 400Ω or greater coil impedance.

REPEATABILITY
Less than 0.2% of span.

DEADBAND
Fixed deadband 0.25%
(0.2 to 98% with Option A)

RESPONSE TIME
Less than 500 milliseconds.

RESET TIME (Latching models only)
5 seconds.

STABILITY
Temperature:
Better than ±0.015% of span per degree Celsius.

COMMON MODE REJECTION
60 Hz: Greater than 120db.
DC: Greater than 140db.

OPERATING TEMPERATURE RANGE (Ambient)
Standard Industrial Environment, -5 to 60°C (20 to 140°F)
(Storage: -20 to 85°C)

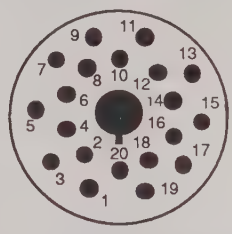
POWER
120Vac ± 10%, 50 to 60Hz, standard.
(100Vac, 120Vac, 240Vac, 24Vdc available). 2.5 Watts typical, 4 Watts maximum.

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defects in parts, materials and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

BOTTOM OF 11-PIN MODULE

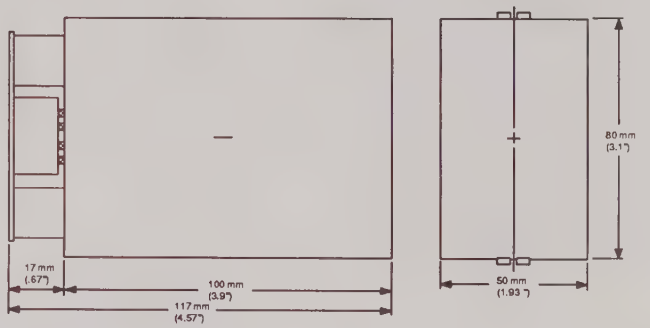


BOTTOM OF 20-PIN MODULE

Socket Mounting Dimensions

Dimensions	8-Pin	11-Pin	20-Pin
Mounting Hole-to-Hole	43mm (1.7")	63mm (2.56")	56mm (2.21")
Socket Width	51mm (2.0")	74mm (2.86")	70mm (2.8")
Socket Height	17mm (0.67")	17mm (0.67")	33mm (1.25")

MODULE CASE



DP1600,DP1601(2) DP1604

PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. Input
5. Input
6. N.O. } Set 1
7. C } Set 1
8. N.C. } Set 1
9. N.O. } Set 2
10. C } Set 2
11. N.C. } Set 2

KEY:

N.O. = Normally Open
C = Common
N.C. = Normally Closed
Proc = Process
Xmtr = Transmitter
CCW = Counterclockwise
W = Wiper
CW = Clockwise
SP = Setpoint

DP1600,DP1601, DP1604 With Option T

PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. No Connection
5. No Connection
6. No Connection
7. No Connection
8. SP Xmtr +
9. Input
10. Xmtr Common
11. Input
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection*
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection*

Pins used for Option V, Voltage Output:
20pin: Set 1 = 14-,15+
Set 2 = 18-,19+
11pin: Set 1 = 7+,8-
Set 2 = 10+,11-

DP1602

PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. No Connection
5. SP Pot CCW
6. SP Pot W
7. SP Pot CW
8. No Connection
9. Input
10. No Connection
11. Input
12. No Connection
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection*
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection*

DP1602 With Option T

PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. No Connection
5. SP Pot CCW
6. SP Pot W
7. SP Pot CW
8. SP Xmtr +
9. Input
10. Xmtr Common
11. Input
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection*
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection*

DP1603

PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. No Connection
5. SP-
6. SP +
7. No Connection
8. No Connection
9. Input
10. No Connection
11. Input
12. No Connection
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection *
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection *

DP1603 With Option T

PIN CONNECTION

1. Line Power +
2. Ground
3. Line Power -
4. No Connection
5. SP -
6. SP +
7. No Connection
8. SP Xmtr +
9. Input
10. Xmtr Common
11. Input
12. Proc Xmtr +
13. N.O. } Set 1
14. C } Set 1
15. N.C. } Set 1
16. No Connection*
17. N.O. } Set 2
18. C } Set 2
19. N.C. } Set 2
20. No Connection*

*** SETPOINT POTENTIOMETER = 1kΩ**

*** Connect pins for contact closure to reset latched relay (designation "1L" in model#)**

(2) For model 1600,1601,1604 with latching relays ("1L" in model#) use 20pin "T" Option hook-up

DORIC

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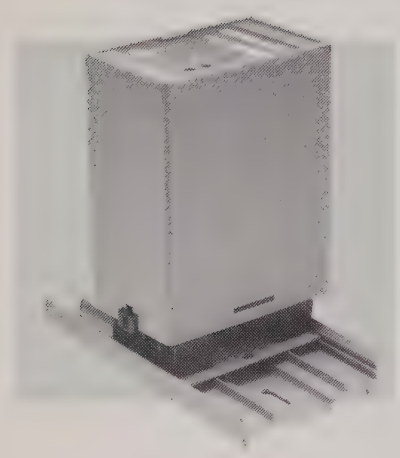
DORIC DATA

AC Input Limit Alarms

DP1620 through DP1624



OPERATION

The DP1620 Limit Alarm Series is a dual **Hi/Lo** limit alarm which accepts AC voltage or AC current as input and provides independent contact closure outputs corresponding to user adjustable **Hi** and **Lo** setpoint adjustments.

The input signal is conditioned to a specific DC level and compared against two fully independent setpoint comparator amplifiers, one **Hi** and one **Lo.** If the input signal rises above the **Hi** setpoint, the **Hi** relay energizes, indicating a **Hi** alarm. If the input falls below the **Lo** setpoint, the **Lo** relay energizes. Each relay will return to its normal de-energized state when the input signal returns to within the "normal" preset area as defined by the **Hi** and **Lo** setpoints. With a dual latching style alarm (designated by a "2L" in the model# eg. 1XXX-X-2L-X) when either relay is tripped they will stay latched in an alarm condition until manually reset.

CALIBRATION

To adjust **zero** and **span**, place the **Lo** setpoint at its minimum setting. Place the **Hi** setpoint at its maximum setting. Using a calibrator or other suitable source, apply **zero** level input and adjust the **zero** trim pot until the **Lo** relay just trips. Apply the maximum **span** input and adjust the **span** trim pot until the **Hi** relay trips. **Zero** and **span** trim pots typically afford ±8-10% adjustability of total **span.**

OPTIONS

A Option - Adjustable Deadband (0.2-98%)
L Option - "Led" Relay Status Indicator
M Option - Multi-turn Screwdriver Setpoint Adj. (STD. is one turn)
T Option - 0-1V Outputs for Setpoint and Process Indicator
V Option - Replaces Relays with 0/12V Outputs (400Ω drive)
R Option - Reverses Normal Relay Sense
X Option - Both Relays Trip on Decreasing Input (Lo.Lo function for DP1X2X models only)
Y Option - Both Relays Trip on Increasing Input (Hi/Hi alarm function)

SPECIFICATIONS

INPUT IMPEDANCE
Voltage
Greater than 200kΩ
Current
500mvac shunt equivalent

INPUT CAPABILITY
Voltage
100mvac to 250vac
Current
100mA to 5amps

SETPOINT RANGE
Setpoint is adjustable over 100% of the input span.

RELAY CONTACTS
Type: Isolated DPDT contacts rated 1A @ 120Vac or 28Vdc
Material:
Silver-Cadium Oxide
Life:
Electrical: 10^5 operations at rated load.
Mechanical: 10^7 operations.
NOTE: External relay contact protection is required for use with inductive loads.

TRANSMITTER OUTPUTS (Option T)
Output Drive
1mA, maximum.
Output impedance
Less than 1Ω.
Linearity (Referenced to Input)
Within 0.05% of span.

RELAY DRIVE VOLTAGE (Option V)
Output Voltage
12Vdc, average
Output Drive
Drives 400Ω or greater coil impedance.

REPEATABILITY
Less than 0.2% of span.

DEADBAND
Fixed deadband 0.25%
(0.2 to 98% with Option A)

RESPONSE TIME
Less than 500 milliseconds.

RESET TIME (Latching models only)
5 seconds.

STABILITY
Temperature:
Better than ±0.015% of span per degree Celsius.

COMMON MODE REJECTION
60 Hz: Greater than 120db.
DC: Greater than 140db.

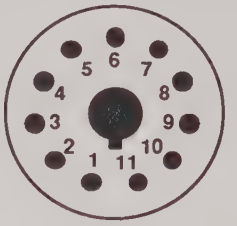
OPERATING TEMPERATURE RANGE (Ambient)
Standard Industrial Environment, -5 to 60°C (20 to 140°F)
(Storage: -20 to 85°C)

POWER
120Vac ± 10%, 50 to 60Hz, standard.
(100Vac, 120Vac, 240Vac, 24Vdc available). 2.5 Watts typical, 4 Watts maximum.

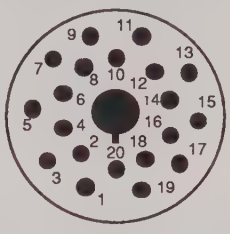
Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defects in parts, materials and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.



BOTTOM OF 11-PIN MODULE

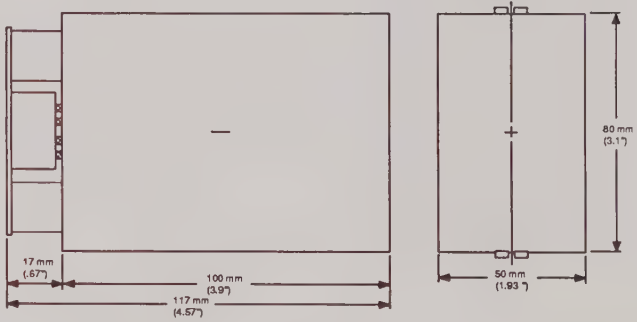


BOTTOM OF 20-PIN MODULE

Socket Mounting Dimensions

Dimensions	8-Pin	11-Pin	20-Pin
Mounting Hole-to-Hole	43mm (1.7")	63mm (2.56")	56mm (2.21")
Socket Width	51mm (2.0")	74mm (2.86")	70mm (2.8")
Socket Height	17mm (0.67")	17mm (0.67")	33mm (1.25")

MODULE CASE



DP1620,DP1621[2] DP1624

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. Input
5. Input
6. N.O. } Hi Set
7. C } Hi Set
8. N.C. } Hi Set
9. N.O. } Lo Set
10. C } Lo Set
11. N.C. } Lo Set

KEY:

N.O. = Normally Open
C = Common
N.C. = Normally Closed
Proc = Process
Xmtr = Transmitter
CCW = Counterclockwise
W = Wiper
CW = Clockwise
SP = Setpoint

DP1620,DP1621, DP1624 With Option T

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. No Connection
5. No Connection
6. No Connection
7. No Connection
8. No Connection
9. Input
10. Proc Xmtr +
11. Input
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

*** Pins used for Option V, Voltage Output:**
20pin: Hi Set = 18-,19+
Lo Set = 14-,15+
11pin: Hi Set = 7+,8-
Lo Set = 10+,11-

DP1622

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. Lo SP Pot CW
5. Lo SP Pot W
6. SP Pot CCW
7. Hi SP Pot W
8. Hi SP Pot CW
9. Input
10. No Connection
11. Input
12. No Connection
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. No Connection
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. No Connection

DP1622 With Option T

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. Lo SP Pot CW
5. Lo SP Pot W
6. SP Pot CCW
7. Hi SP pot W
8. Hi SP Pot CW
9. Input
10. Proc Xmtr +
11. Input
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

DP1623

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. No Connection
5. Lo SP +
6. SP Common
7. Hi SP +
8. No Connection
9. Input
10. No Connection
11. Input
12. No Connection
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. No Connection
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. No Connection

DP1623 With Option T

PIN CONNECTION

1. Line Power + *
2. Ground
3. Line Power -
4. No Connection
5. Lo SP +
6. SP Common
7. Hi SP +
8. No Connection
9. Input
10. Proc Xmtr +
11. Input
12. Lo SP Xmtr +
13. N.O. } Lo Set
14. C } Lo Set
15. N.C. } Lo Set
16. Hi SP Xmtr +
17. N.O. } Hi Set
18. C } Hi Set
19. N.C. } Hi Set
20. Xmtr Common

*** SETPOINT POTENTIOMETER = 1kΩ**

*** Disconnect all power to reset latched relay (designation "2L" in model#)**

(2) For model 1620,1621,1624 with latching relays ("2L" in model#) use 20pin "T" Option hook-up

DORIC

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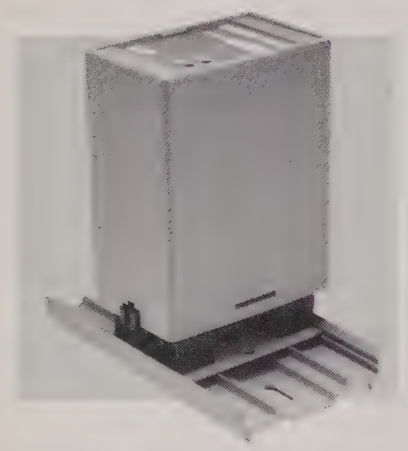
DORIC DATA

RTD Transmitter Module

DP4001



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The DP4001 is a general purpose RTD input signal conditioner which utilizes an active bridge circuit with low excitation current (2mA) and provides a DC ouptut proportional to the input resistance change. Lead length compensation is provided to sense and adjust for RTD lead length.

CALIBRATION

The DP4001 has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory to within ±0.2% of full scale. Should field calibration be required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end, for required full scale output (adjustment range of each control is typically ±5% of span). Repeat procedure as required.

SPECIFICATIONS

RTD EXCITATION CURRENT (Maximum)
100Ω PT: 5mA
500Ω PT: 2mA
120Ω NI: 5mA
10Ω CU: 5mA

INPUT PROTECTION
Normal Mode:
±5Vdc.
Common Mode:
600Vdc input to ground.

OUTPUT IMPEDANCE
Voltage:
Less than 10Ωs.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA maximum @ 15V
(750Ω load)

STABILITY
0.015% of span per °C.

RESPONSE TIME
200 milliseconds.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20-140°F).

STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

POWER
100Vac, 120Vac, 240Vac,
24Vdc. (specify).
4 watts maximum.

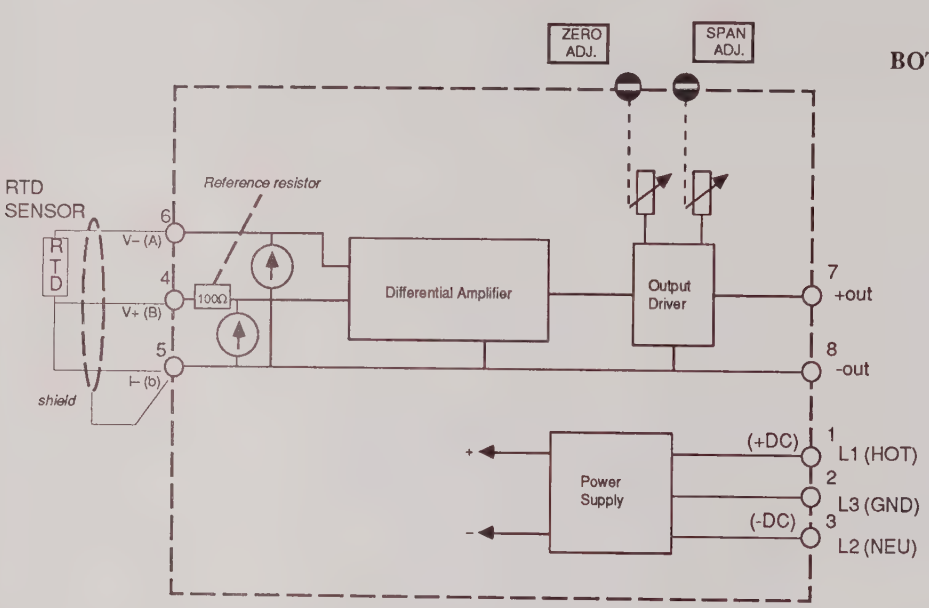
REPEATABILITY
±0.1% of span.

LINEARITY
±0.1% of span.

ZERO & SPAN ADJUSTMENT
±5% of each control.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

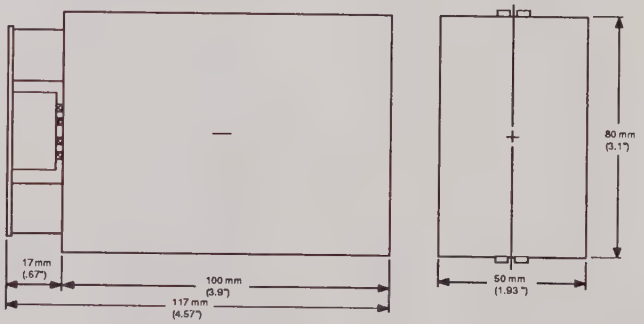
PIN CONNECTION

1. **Line Power**
2. **Shield**
3. **Line Power**
4. **Comp. Lead**
5. **RTD Comp. Side**
6. **RTD**
7. **Output +**
8. **Output -**

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	17mm(0.67")

MODULE CASE



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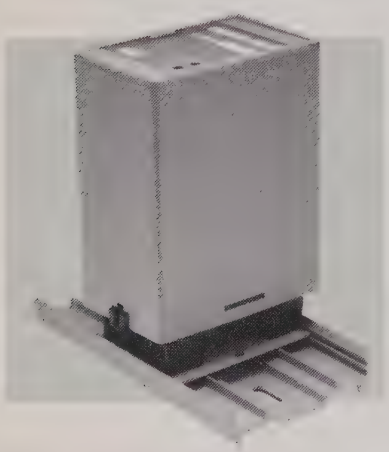
DORIC DATA

Potentiometer Transmitter Module

DP4003



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP4003 Potentiometer Transmitter Module provides a DC output in proportion to the resistance provided by a variable resistor, slide-wire, or other general purpose potentiometer input. Any potentiometer value between 100Ω to 100kΩ can be used for input. A constant voltage source is applied to the input potentiometer. Using this method allows almost any value of potentiometer to be used in providing an input signal to the module. The input signal is then conditioned to a pre-selected output range.

CALIBRATION

The DP4003 has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory to within ±0.25% of full scale from reference input level. Should field calibration be required, use a small screwdriver to adjust **Zero** with input at 0% potentiometer value for required minimum output. Then adjust **Span** with input at 100% potentiometer value, for required full scale output. Repeat procedure as required until adjustments are no longer necessary.

SPECIFICATIONS

INPUT
Any potentiometer:
100Ω to 100kΩs.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA maximum @ 15V
(750Ω load)

STABILITY
0.015% of span per °C.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

RESPONSE TIME
200 milliseconds typical.

OPERATING TEMPERATURE
-5 to 60°C. (20-140°F).

STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

POWER
100Vac, 120Vac, 240Vac,
24Vdc. (specify).
4 watts maximum.

REPEATABILITY
±0.1% of span.

LINEARITY
±0.1% of span.

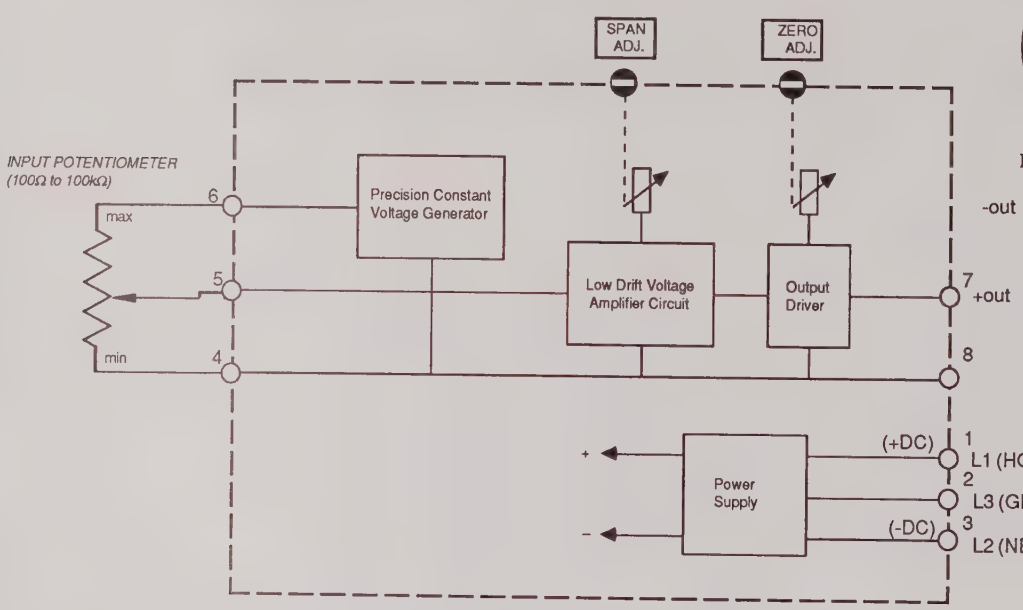
ZERO & SPAN ADJUSTMENT
Span: -50%
Zero: +33%

OUTPUT RIPPLE
Less than 0.2% of span
peak to peak.

Specifications subject to change without notice.

BOTTOM OF 8-PIN MODULE

BLOCK CIRCUIT DIAGRAM



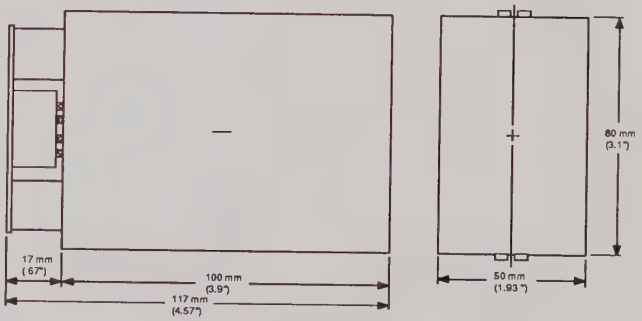
PIN CONNECTION

1. Line Power
2. Ground
3. Line Power
4. Potentiometer minimum
5. Potentiometer wiper
6. Potentiometer maximum
7. Output +
8. Output -

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	17mm(0.67")

MODULE CASE



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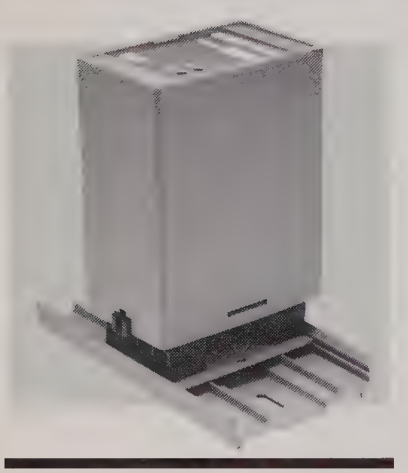
DC Transmitter Module

DP4010



OPERATION

The model DP4010 is a non-isolated DC to DC transmitter, which is available in many different input/output ranges. Applications for the DP4010 include: impedance matching; signal matching; and level shifting.

CALIBRATION

The DP4010 has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory to within ±0.25% of full scale from reference input level. Adjustment range is ±5% of span (typical). For fine adjustment, set input to minimum and adjust **Zero** pot for minimum output. Set input to maximum and adjust **Span** pot for maximum output. Repeat procedure as required until adjustments are no longer necessary.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

SPECIFICATIONS

INPUT
DC voltage or current.

INPUT IMPEDANCE
Voltage:
Greater than 1MΩ.
Current:
10Ωs.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA maximum @ 15V
(750Ω load).

STABILITY
Better than 0.015% of
span per °C.

RESPONSE TIME
200 milliseconds.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20-140°F).

STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH
(non-condensing).

POWER
100Vac, 120Vac, 240Vac,
24Vdc. (specify).
4 watts maximum.

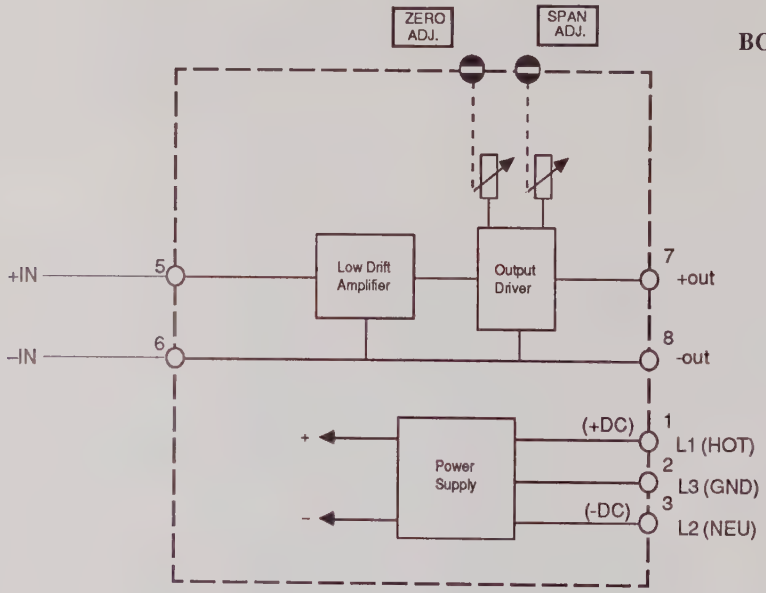
REPEATABILITY
±0.1% of span.

LINEARITY
±0.1% of span.

ZERO & SPAN ADJUSTMENT
±5% of each control.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

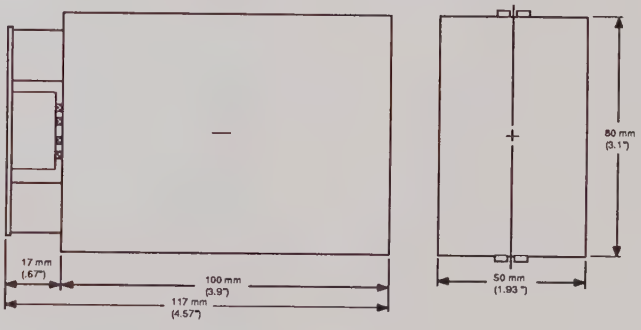
PIN CONNECTION

1. **Line Power**
2. **Ground**
3. **Line Power**
4. **No Connection**
5. **Input +**
6. **Input -**
7. **Output +**
8. **Output -**

Socket Mounting Dimensions

Dimensions	11-pin
Mounting Hole-to-Hole	63mm(2.56")
Socket Width	74mm(2.86")
Socket Height	17mm(0.67")

MODULE CASE



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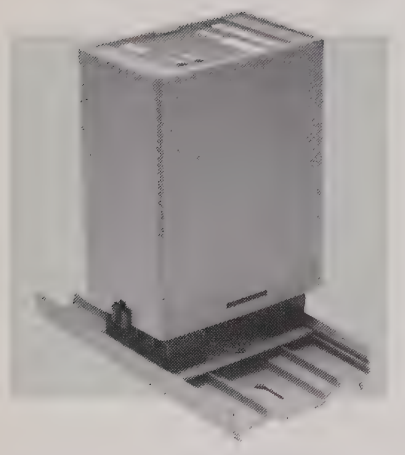
DORIC DATA

DC Transmitter Modules

DP4050/DP4250



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP4050 and DP4250 DC Transmitter Modules provide a DC output in proportion to a narrow range DC input. The output is available in many voltage or current ranges. Applications for both modules include: impedance matching; conditioning a low level sensor signal into a high level signal output; and level shifting.

CALIBRATION

The DP4050 and the DP4250 have zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory within ±0.5% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end for required full scale output (adjustment range of each control is typically ±5% of span). Repeat procedure as required.

SPECIFICATIONS

INPUT
Less than 100mV (4050).
Less than 10mV (4250).

INPUT IMPEDANCE
Voltage:
Greater than 1MΩ.
Current:
10Ωs.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA @ 15V (750Ω load).

STABILITY
Better than 0.015% of span per °C.

RESPONSE TIME
200 milliseconds.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F).

STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH (non-condensing).

POWER
100Vac, 120Vac, 240Vac, 24Vdc (specify).
4 watts maximum.

REPEATABILITY
0.1% of span.

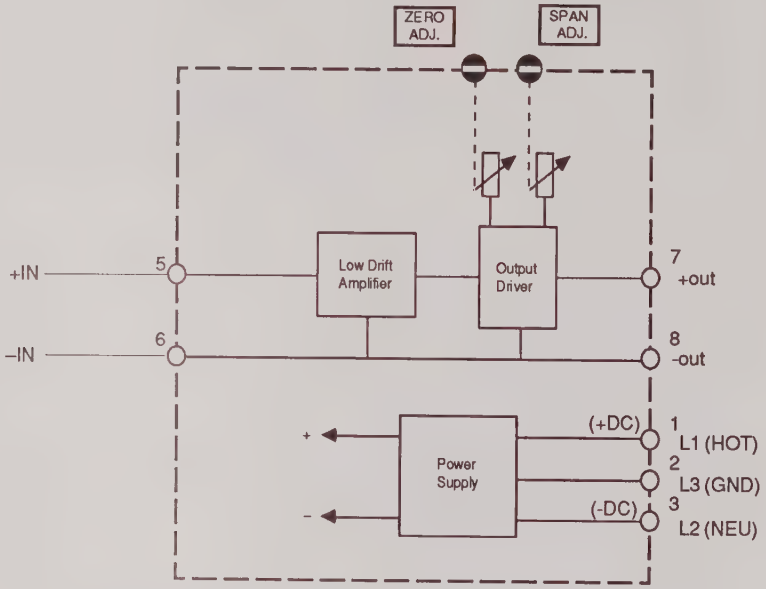
LINEARITY
Better than 0.01% of span.

ZERO AND SPAN ADJUST
±5% of span.

OUTPUT RIPPLE
Less than 0.2% of span peak to peak.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

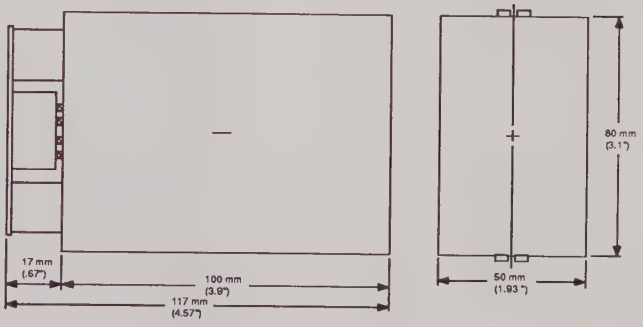
PIN CONNECTION

1. **Line Power**
2. **Ground**
3. **Line Power**
4. **No Connection**
5. **Input +**
6. **Input -**
7. **Output +**
8. **Output -**

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	68mm(2.75")

MODULE CASE



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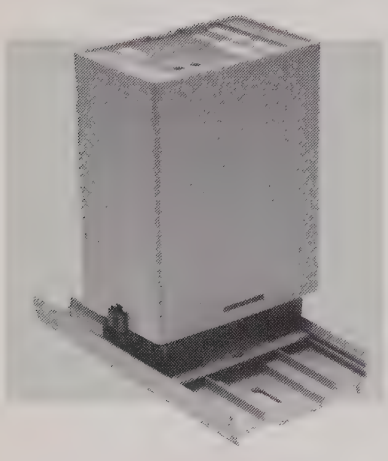
DORIC DATA

Differential RTD Transmitter

DP4041



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP4041 Differential RTD Transmitter provides a conditioned DC output in proportion to the temperature difference of two 2-wire Resistance Temperature Detector (RTD) inputs. The DP4041 is useful in any differential temperature measuring application, such as determining BTU transfer rate (DT x k x flow), and in solar heating systems, where flow of the heat storage liquid is controlled according to differential temperature.

CALIBRATION

The DP4041 has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory to within ±0.2% of full scale from reference input level. For best results, calibrate the unit at the center of the working temperature range. With both RTD's at the same temperature, adjust **Zero** for minimum output. With the RTD's at the maximum differ-ential temperature, adjust **Span** for maximum output. Repeat procedure as required. Always use equal length lead wires, and it is recommended that matched RTD's are used.

SPECIFICATIONS

INPUT
RTD; PLT 100Ω.

EXCITATION CURRENT
2mA.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA @ 15V (750Ω load).

STABILITY
Better than 0.05% of span per °C.

RESPONSE TIME
200 milliseconds.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F).

STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH (non-condensing).

POWER
100Vac, 120Vac, 240Vac, 24Vdc (specify).
4 watts maximum.

REPEATABILITY
0.3% of span.

LINEARITY
0.3% of span linear to resistance.

ZERO AND SPAN ADJUST
±5% of span.

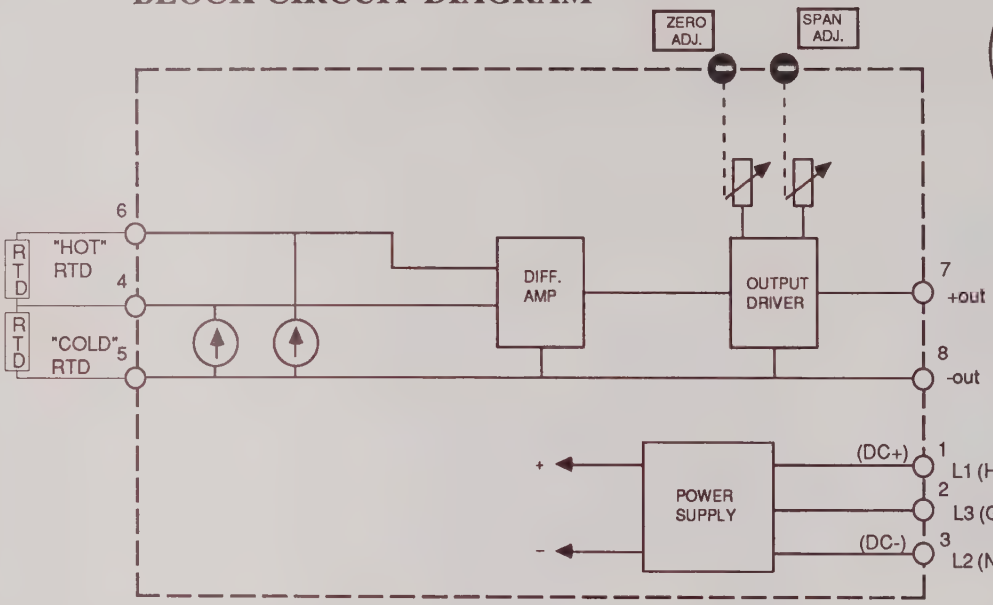
OUTPUT RIPPLE
Less than 0.2% of span peak to peak.

LEADWIRE RESISTANCE
10Ωs per wire maximum.

Specifications subject to change without notice.

BOTTOM OF 8-PIN MODULE

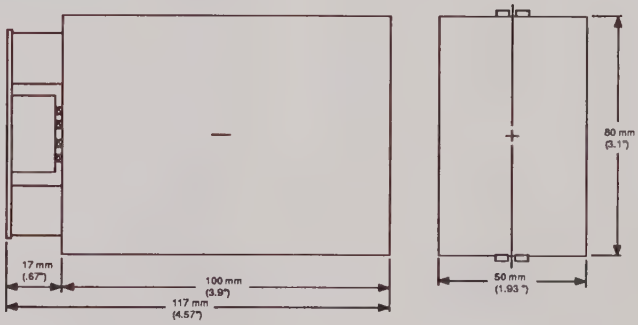
BLOCK CIRCUIT DIAGRAM



PIN CONNECTION

1. Line Power
2. Ground
3. Line Power
4. Input Common
5. "Cold" RTD
6. "Hot" RTD
7. Output +
8. Output -

MODULE CASE



Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	68mm(2.75")

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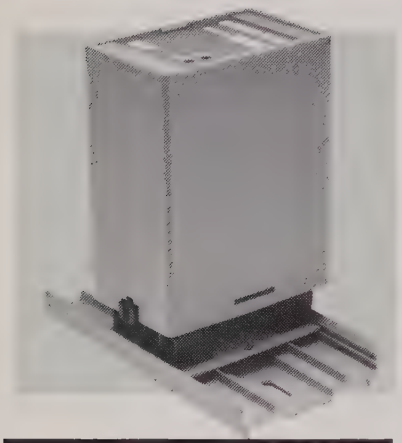
DORIC DATA

Strain Gauge Amplifier/ Conditioner Module

DP4051



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP4051 is a Strain Gauge Amplifier/Conditioner Module (strain, force, pressure, and load cell transducers). The DP4051 provides the strain gauge with excitation (5V), then amplifies the mV/V signal to a high level signal. (4-20mA, 1-5V, etc.). The DP4051 can be used to interface strain gauges with instrumentation such as meters, indicators, and/or recorders.

CALIBRATION

The DP4051 has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory to within ±0.2% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero Coarse** with input at the low end for required (approximate) minimum output. Then adjust **Span Coarse** with input at the high end for required (approximate) full scale output (adjustment range of each control is typically ±15% of span). Repeat procedure as required using the **Zero Fine** and **Span Fine** controls to attain the exact output and until adjustments are no longer necessary.

SPECIFICATIONS

INPUT IMPEDANCE
Greater than 100kΩs.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA maximum @ 15V
(750Ω load).

STABILITY
Better than 0.015% of span per °C.

RESPONSE TIME
Less than 1.5 milliseconds.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20-140°F).

STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH
(non-condensing).

POWER
100Vac, 120Vac, 240Vac,
24Vdc. (specify).
4 watts maximum.

REPEATABILITY
±0.1% of span.

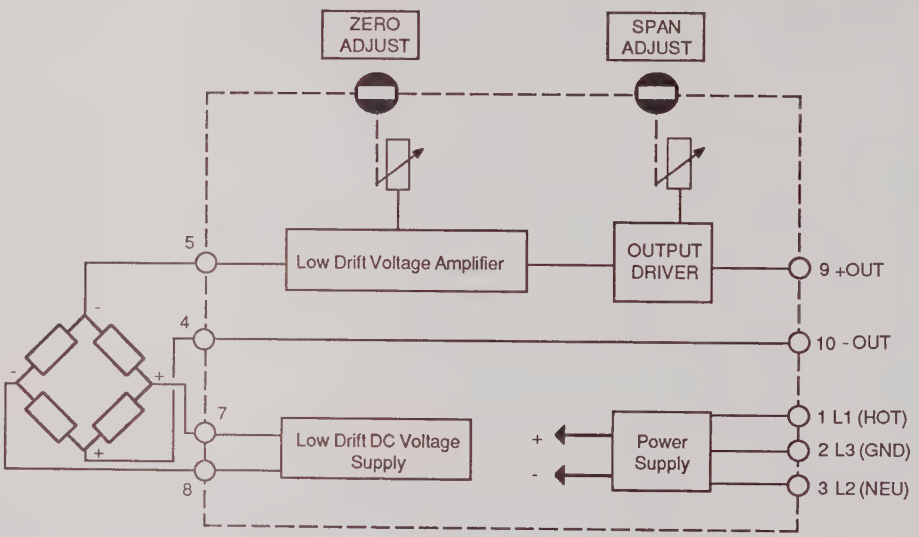
LINEARITY
±0.1% of span.

ZERO & SPAN ADJUSTMENT
Zero: ±15% adjustment.
Span: ±15% adjustment.

EXCITATION
5V @ 60mA maximum.
(80Ω bridge minimum).

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 11-PIN MODULE

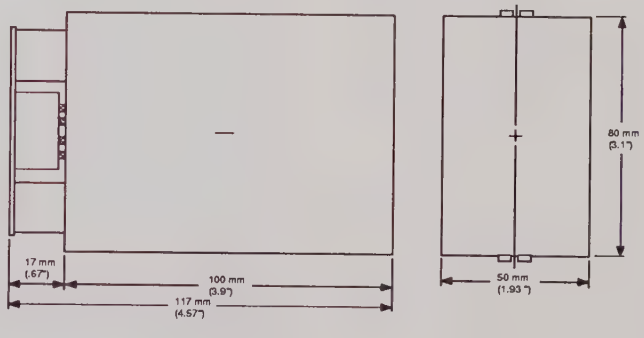
PIN CONNECTION

1. Line Power
2. Ground
3. Line Power
4. Input +
5. Input -
6. No Connection
7. Exc +
8. Exc -
9. Output +
10. Output -
11. No Connection

Socket Mounting Dimensions

Dimensions	11-pin
Mounting Hole-to-Hole	63mm(2.56")
Socket Width	74mm(2.86")
Socket Height	17mm(0.67")

MODULE CASE



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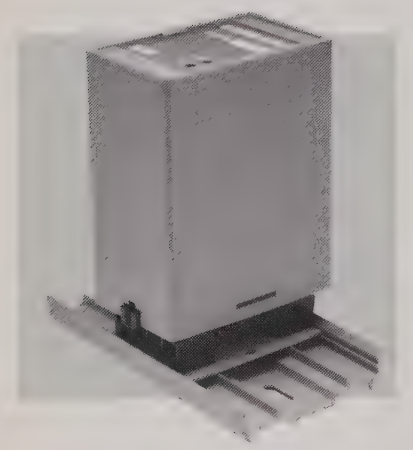
DORIC DATA

Isolated Thermocouple Transmitter Module

DP4150



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP4150 Isolated Thermocouple Transmitter Module provides an isolated, linearized DC output from a thermocouple input. The output is available in many voltage or current ranges. The DP4150 has upscale burnout protection (the output goes to full scale if the thermocouple opens) and cold-junction compensation.

CALIBRATION

The DP4150 has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory within ±0.5% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end for required full scale output (adjustment range of each control is typically ±5% of span). Repeat procedure as required.

SPECIFICATIONS

INPUT PROTECTION
Upscale burnout protected.

INPUT IMPEDANCE
1MΩ.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA @ 15V (750Ω load).

STABILITY
Better than 0.015% of span per °C.

RESPONSE TIME
200 milliseconds.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 14°F).

STORAGE TEMEPRATURE
-20 to 80°C. (-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH (non-condensing).

POWER
100Vac, 120Vac, 240Vac, 24Vdc (specify).
4 watts maximum.

REPEATABILITY
0.1% of span.

LINEARITY
0.2% of span.
(Linear to temperature)

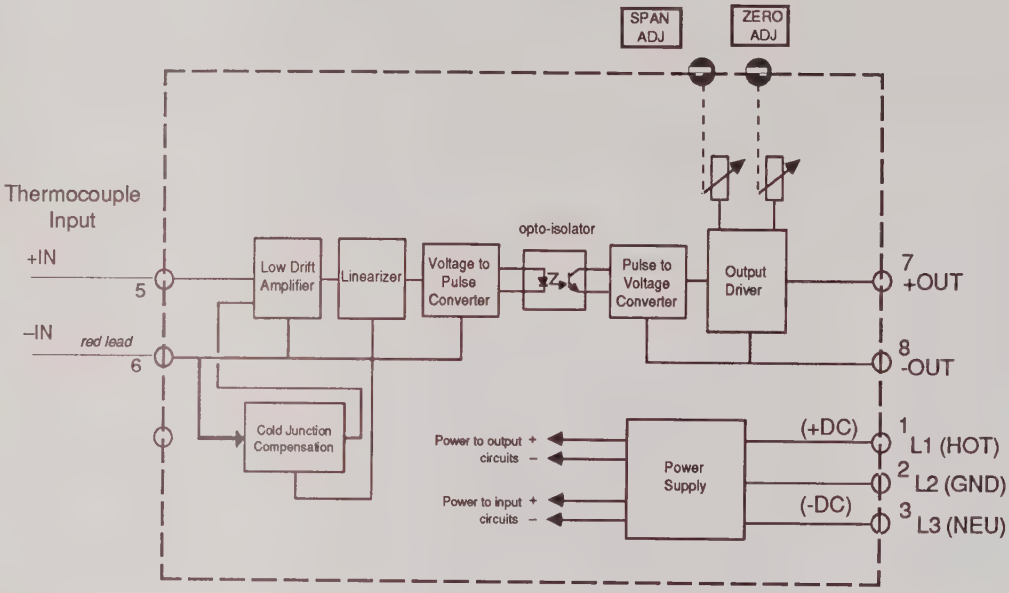
ZERO AND SPAN ADJUST
±5% of span.

ISOLATION
1000Vdc or AC peak.

OUTPUT RIPPLE
Less than 0.2% of span peak to peak.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

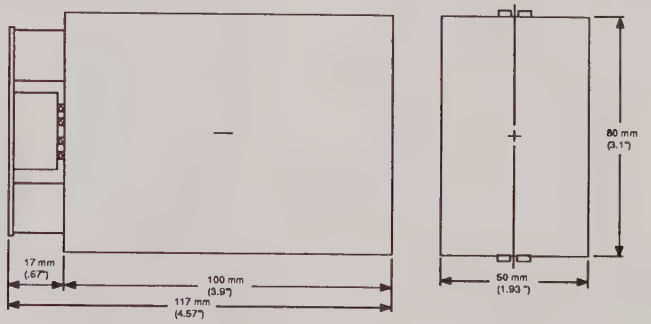
PIN CONNECTION

1. **Line Power**
2. **Ground**
3. **Line Power**
4. **N.C.**
5. **Iput+**
6. **Input-**
7. **Output +**
8. **Output -**

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	68mm(2.75")

MODULE CASE



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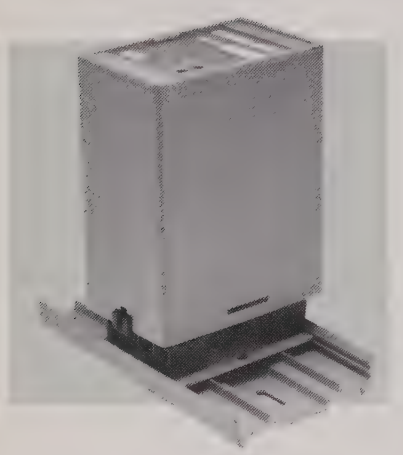
DORIC DATA

Linearizing RTD Transmitter Module

DP4151



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP4151 Linearizing RTD Transmitter Module provides a DC output which is linear to the temperature sensed by a three-wire **Resistance Temperature Device** (RTD) (two and four-wire RTD's can also be accomodated). The DP4151 features an active bridge circuit using a low excitation current (2mA) for minimum RTD self-heating, isolation and burn-out protection circuit that responds to an open or unconnected RTD sensor by driving the output to full scale. The output signal is available in many voltage or current ranges.

CALIBRATION

The DP4151 has zero and span calibration adjustment control at the top of the module. Calibration is set at the factory to within ±0.3% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end, for required full scale output (adjsutment range of each control is typically ±5% of span). Repeat procedure as required.

SPECIFICATIONS

INPUT
RTD; PLT 100Ω.
PLT 50Ω.

BURNOUT PROTECTION
Upscale burnout.

EXCITATION CURRENT
2mA.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA @ 15V (750Ω load).

STABILITY
Better than 0.05% of span per °C.

RESPONSE TIME
200 milliseconds.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F).
Storage: -20 to 80°C.
(-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH
(non-condensing).

POWER
100Vac, 120Vac, 240Vac,
24Vdc (specify).
4 watts maximum.

REPEATABILITY
0.1% of span.

LINEARITY
0.2% of span.
(Linear to temperature)

ZERO AND SPAN ADJUST
±5% of span.

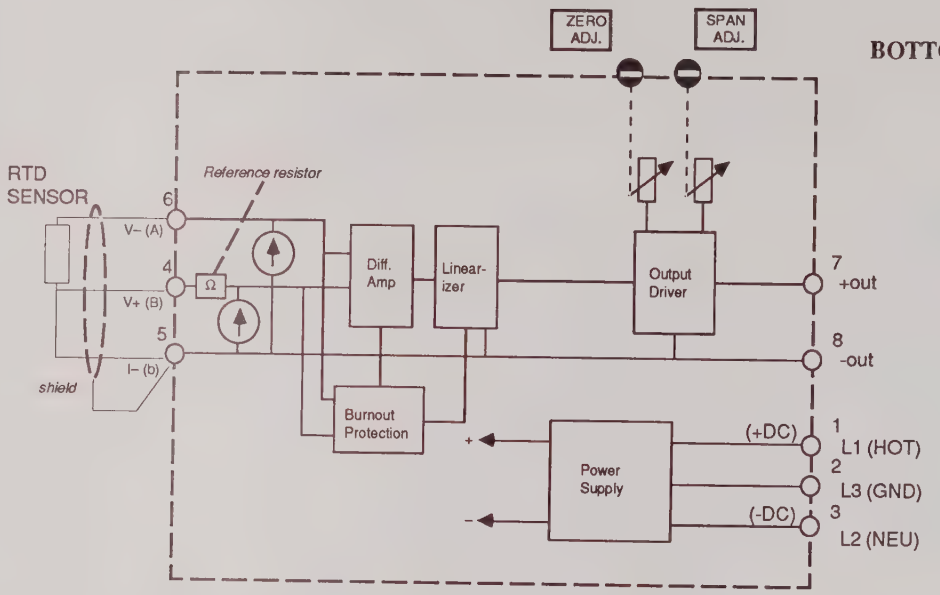
ISOLATION
1000Vdc or AC peak.

OUTPUT RIPPLE
Less than 0.2% of span peak to peak.

LEADWIRE RESISTANCE
200Ωs per wire maximum.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

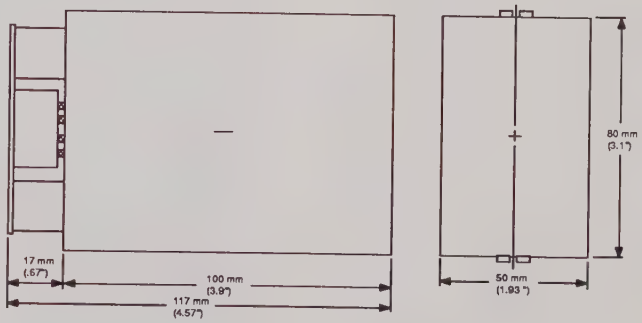
PIN CONNECTION

1. **Line Power**
2. **Ground**
3. **Line Power**
4. **Sense -**
5. **Exc -**
6. **Exc +**
7. **Output +**
8. **Output -**

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	68mm(2.75")

MODULE CASE



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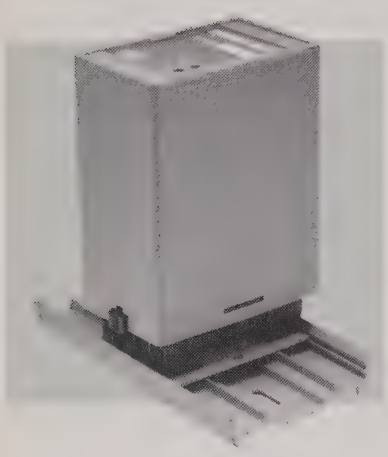
DORIC DATA

Linearizing Isolated DC Transmitter Module

DP4155



OPERATION

The Model DP4155 Linearizing DC Transmitter Module is a microprocessor based instrument that provides a linearized DC output in response to a DC input. The DC input is a non-linear voltage whose span is a standard range or user specified range. ROM memory stores the linearization table of a stan-dard function (i.e. square root, expo- nential, etc.) or a custom curve as specified by the user. The DC output is a selected range of current or voltage. The DP4155 is optically isolated input/output to 1000V.

Typical applications handled by the DP4155 include flow by differential pressure, liquid level-to-volume conversion, concentration control, ratio control, and temperature sensor linearization.

CALIBRATION

The DP4155 has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory within ±0.2% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end, for required full scale output (adjustment range of each control is typically ±5% of span). Repeat procedure as required.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of *three years* commencing with date of shipment to original purchaser.

SPECIFICATIONS

ACCURACY
±0.2%

LINEARITY
±0.1%

REPEATABILITY
±0.1% of span

RESPONSE TIME
300 milliseconds typical.

ISOLATION
1000Vdc or AC peak.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F)

STORAGE TEMPERATURE
-25 to 70°C. (-5 to 175°F)

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

ZERO AND SPAN DRIFT
±0.015% per degrees C.

WARM-UP TIME TO SPEC
15 minutes.

POWER
100Vac, 120Vac, 240Vac, 24Vdc. 3 watts typical.

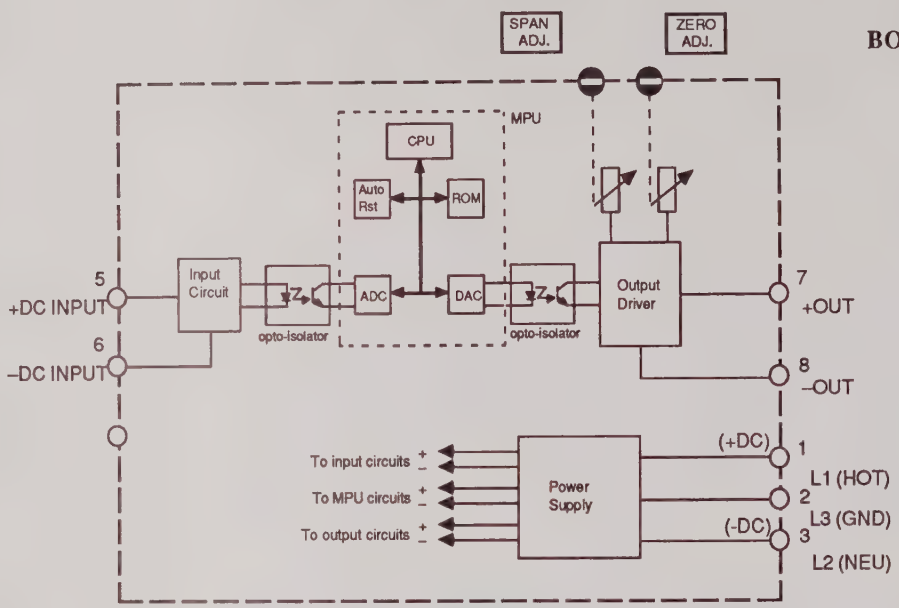
INPUT IMPEDANCE
Voltage Input: >1MΩ.
Current Input: 200mV shunt equivalent.

OUTPUT IMPEDANCE
Voltage Output: <10Ω.
Current Output: > 2MΩ.

OUTPUT DRIVE
Voltage Output: 10mA.
Current Output: 15V drop. (750Ω load)

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

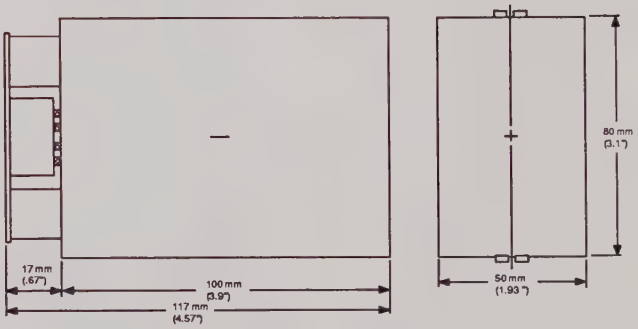
PIN CONNECTION

1. Line Power
2. Ground
3. Line Power
4. No Connection
5. Input +
6. Input -
7. Output +
8. Output -

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	68mm(2.75")

MODULE CASE



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DORIC DATA

Isolating Transmitter Modules

DP4300/DP4310

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP4300 and DP4310 Isolating Transmitter modules provide an isolated DC output in proportion to a DC input signal. Model DP4310 specializes in handling a narrow range voltage input (i.e., 0-10mV). The DC output signal is a selected range of current kor voltage. The DP4300 and DP4310 are UL© approved devices. Special versions of these modules provide up to 2000V optical isolation, and as fast as 500*us* response time input to output.

CALIBRATION

The DP4300 and the DP4310 have zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory within ±0.25% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end for required full scale output (adjustment range of each control is typically ±5% of span). Repeat procedure as required.

SPECIFICATIONS

ACCURACY
±0.5% (±0.25% of span with input spans > 1V)

LINEARITY
±0.2%

REPEATABILITY
±0.1% of span.

RESPONSE TIME
< 0.5 seconds.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F)

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

STORAGE TEMPERATURE
-25 to 70°C. (-5 to 175°F)

WARM-UP TIME TO SPEC
15 minutes.

ZERO AND SPAN DRIFT
±0.015% per degrees C.

POWER
100Vac, 120Vac, 240Vac, 24Vdc. 3 watts typical.

INPUT IMPEDANCE
Voltage Input: > 1MΩ.
Current Input: 200mV shunt equivalent.

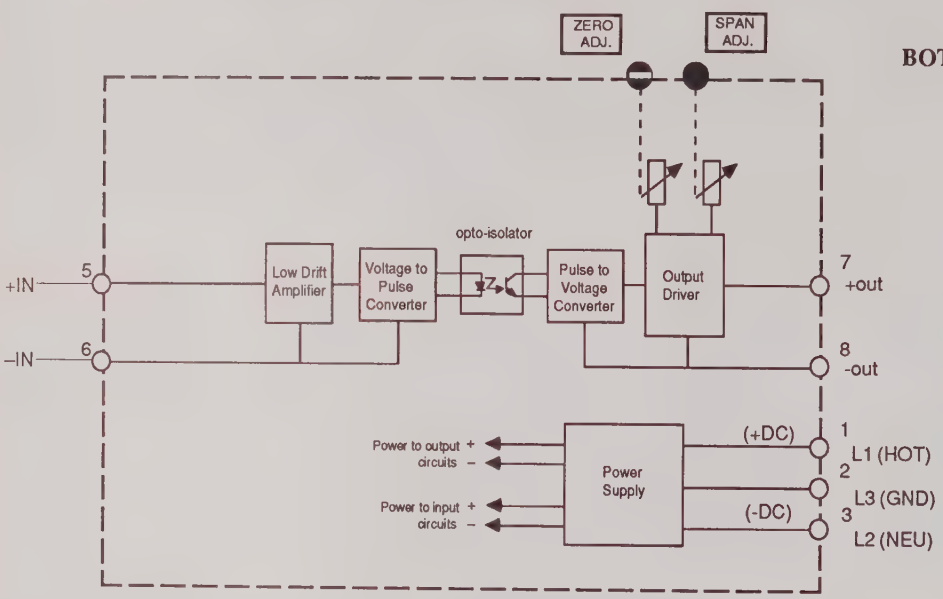
OUTPUT IMPEDANCE
Voltage Output: <10Ω.
Current Output: > 2MΩ.

OUTPUT DRIVE
Voltage Output: 10mA.
Current Output: 15V drop. (750Ω load).

ISOLATION
1000Vdc or AC peak.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

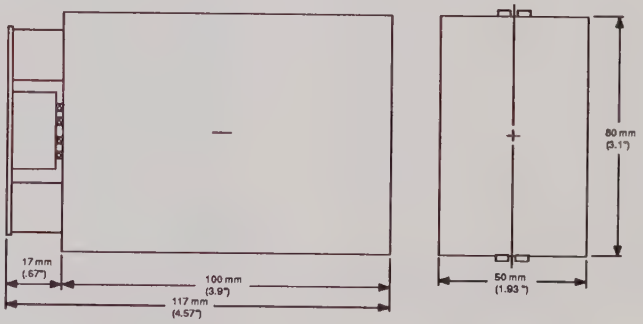
PIN CONNECTION

1. Line Power
2. Ground
3. Line Power
4. No Connection
5. Input +
6. Input -
7. Output +
8. Output -

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	68mm(2.75")

MODULE CASE



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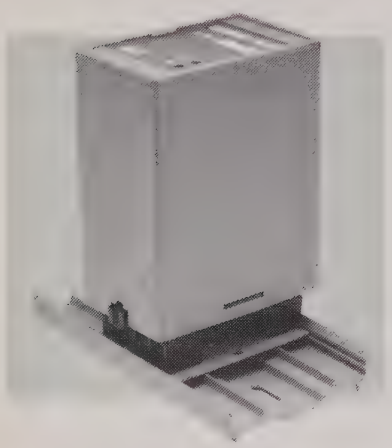
High-Speed Isolating Transmitter

DP4370



OPERATION

The DP4370 is a high-speed isolating transmitter suitable for many applications where fast conversion times are required for accurate readings or control signals.

In addition to high-speed conversion (200 *us*) the DP4370 offers up to 1000 volts optical isolation from input to output which eliminates ground loops that can cause reading errors.

CALIBRATION

The DP4370 has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory within ±0.25% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end for required full scale output (adjustment range of each control is typically ±5% of span). Repeat procedure as required.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

SPECIFICATIONS

HUMIDITY
90% RH (non-condensating).

LINEARITY
±0.1%

REPEATABILITY
±0.1% of span.

RESPONSE TIME
200 microseconds typical.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F)

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

STORAGE TEMPERATURE
-25 to 70°C. (-5 to 175°F)

WARM-UP TIME TO SPEC
15 minutes.

ZERO AND SPAN DRIFT
±0.015% per degrees C.

POWER
100Vac, 120Vac, 240Vac, 24Vdc. 3 watts typical.

INPUT IMPEDANCE
Voltage Input: > 1MΩ.
Current Input: 200mV shunt equivalent.

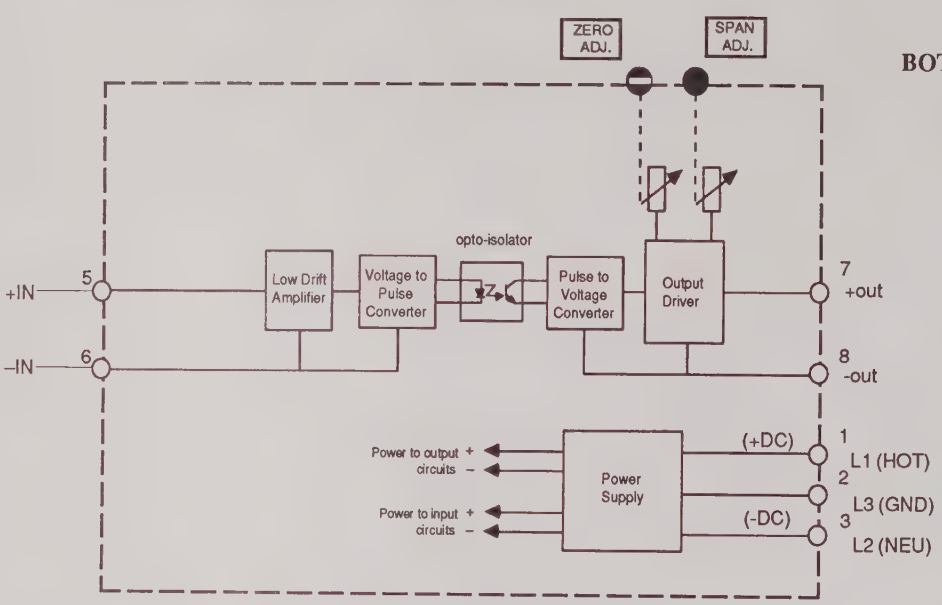
OUTPUT IMPEDANCE
Voltage Output: <10Ω.
Current Output: > 2MΩ.

OUTPUT DRIVE
Voltage Output: 10mA.
Current Output: 15V drop. (750Ω load).

ISOLATION
1000Vdc or AC peak.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM

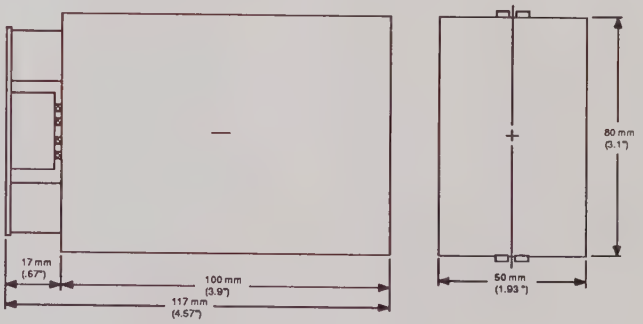


BOTTOM OF 8-PIN MODULE

PIN CONNECTION

1. **Line Power**
2. **Ground**
3. **Line Power**
4. **No Connection**
5. **Input +**
6. **Input -**
7. **Output +**
8. **Output -**

MODULE CASE



Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	17mm(0.6")

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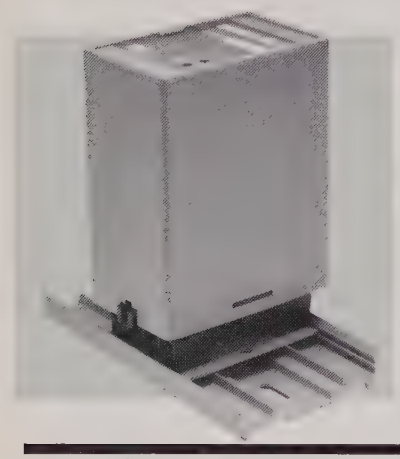
DORIC DATA

Track & Hold/Peak Hold Modules

DP4570T/P



OPERATION

The Model DP4570T/P Track & Hold/ Peak Hold Module is available in two versions. The inputs and outputs are available in many voltage or current ranges.

In response to a switch closure at the control input, the Track & Hold version of the DP4570T holds the output signal at a level as determined by the input at the moment of switch closure. When the control input switch is opened, the output signal tracks the input signal again.

With the Peak Hold version of the DP4570P, a switch closure at the control input forces the output signal to hold whenever the DC input signal reaches a peak value (maximum or minimum as determined by a configuration ordered). The output signal again tracks the input signal when the control input switch is opened.

CALIBRATION

The DP4570T/P has zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory to within ±0.4% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end for required full scale output adjustment range of each control is typically ±5% of span). Repeat procedure as required.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of *three years* commencing with the date of shipment to the original purchaser.

SPECIFICATIONS

INPUT IMPEDANCE
Voltage:
Greater than 1MΩ.
Current:
10Ωs.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA maximum @ 15V (750Ω load).

STABILITY
Better than 0.05% of span per °C.

RESPONSE TIME
200 milliseconds.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20-140°F).

STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH (non-condensing).

POWER
100Vac, 120Vac, 240Vac, 24Vdc. (specify).
4 watts maximum.

REPEATABILITY
±0.2% of span.

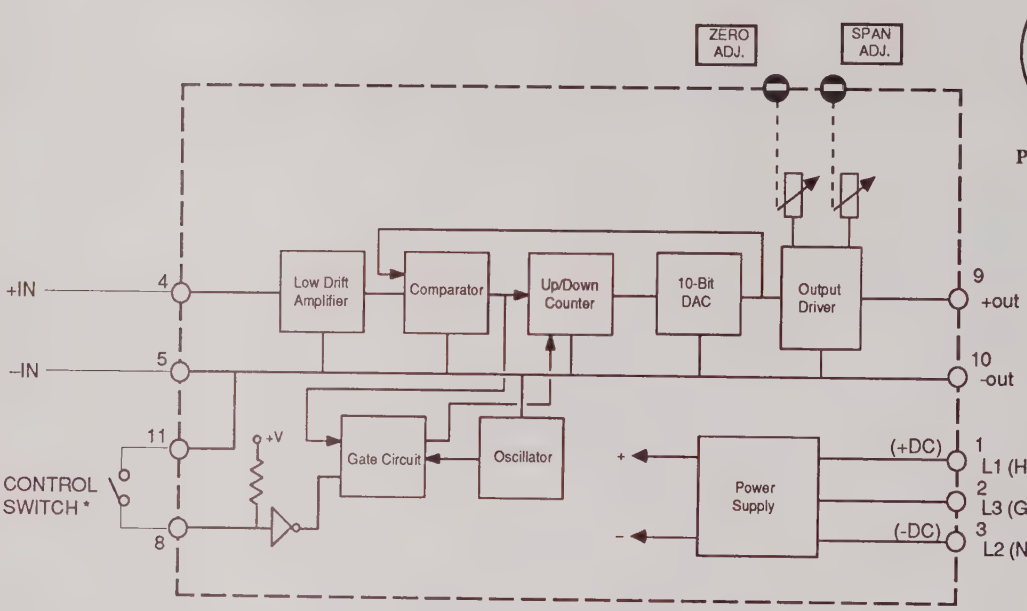
LINEARITY
±0.2% of span.

ZERO & SPAN ADJUSTMENT
±5% of each control.

OUTPUT RIPPLE
Less than 0.2% of span peak to peak.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 11-PIN MODULE

PIN CONNECTION

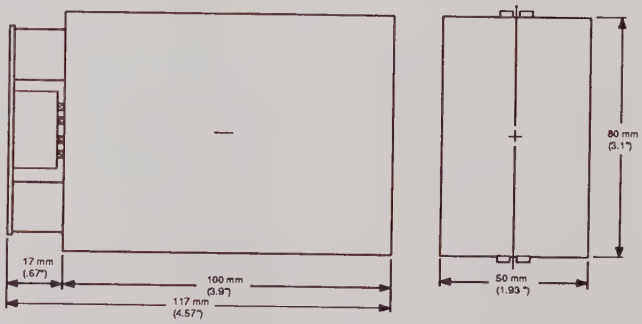
1. Line Power
2. Ground
3. Line Power
4. Input +
5. Input -
6. No Connection
7. No Connection
8. Switch
9. Output +
10. Output -
11. Switch

** CLOSE CONTROL SWITCH FOR HOLD OR PEAK HOLD FUNCTION.*

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	17mm(0.67")

MODULE CASE



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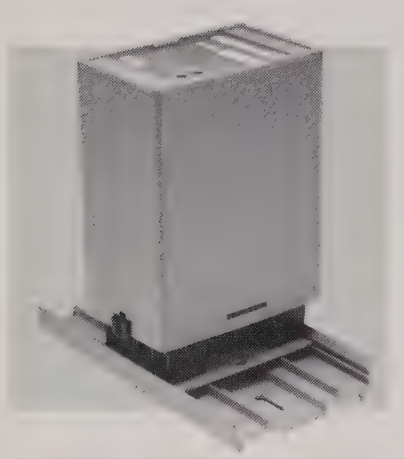
DORIC DATA

Constant Response Transmitter

DP4580



OPERATION

The DP4580 has an output that will ramp at a fixed rate no matter how abrupt the input signal changes. This ramp rate is adjustable from 0.5 to 40 seconds (minimum to maximum output). For input changes below the ramp rate, the output will track the input. For input changes above the ramp rate, the output will increase at the ramp rate. This ramp rate is linear output, not an RC time constant, known as a constant response.

Even units with large RC time constants sometimes cannot dampen abrupt input changes without slowing the system to an undesireable level. The DP4580 can be used in these systems to eliminate noise and smooth input changes without degrading the system performance.

CALIBRATION

Rate: Set the response time pot to 40 seconds. Slowly turn the response time pot counter-clockwise until unwanted changes appear. Turn the response time pot slightly clockwise, the system should now be calibrated.

Span: If calibration is required, set the input to minimum and adjust **Zero**, slowly, for minimum output. Set the input at maximum and adjust **Span**, slowly, for maximum output.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

SPECIFICATIONS

INPUT IMPEDANCE
Voltage:
Greater than 1MΩ.
Current:
10Ωs.

OUTPUT IMPEDANCE
Voltage:
1Ω.
Current:
Greater than 1MΩ.

OUTPUT DRIVE
Voltage:
10mA maximum.
Current:
20mA maximum @ 15V
(750Ω load).

STABILITY
Better than 0.015% of span per °C.

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F).

STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH
(non-condensing).

POWER
100Vac, 120Vac, 240Vac,
24Vdc. (specify).
4 watts maximum.

REPEATABILITY
±0.2% of span.

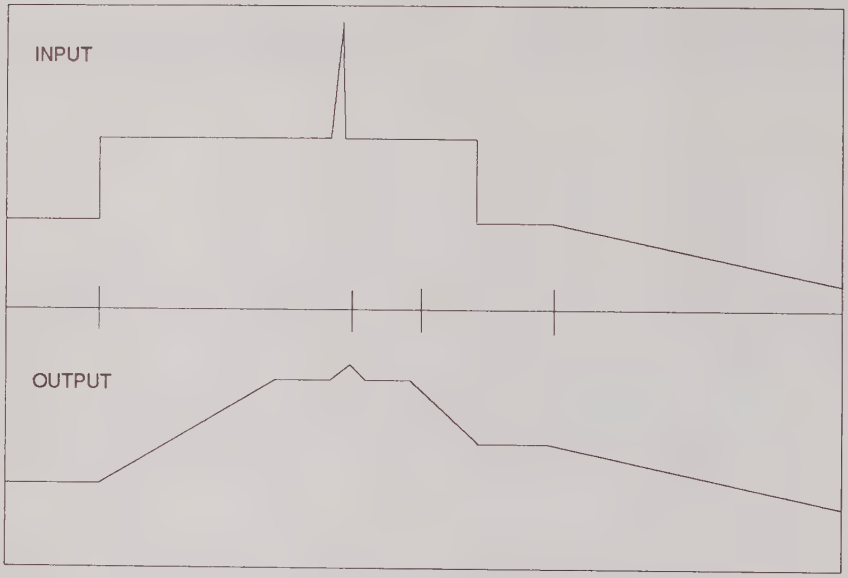
LINEARITY
±0.2% of span.

ZERO & SPAN ADJUSTMENT
±5% of span.

CONSTANT RESPONSE
(0 to 100%)
0.5 to 40 seconds.

Specifications subject to change without notice.

FUNCTION DIAGRAM



BOTTOM OF 8-PIN MODULE

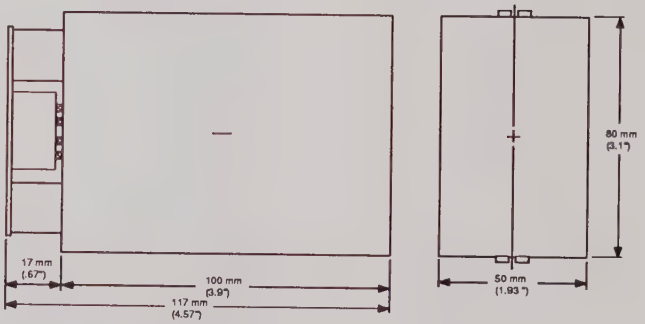
PIN CONNECTION

1. Line Power
2. Ground
3. Line Power
4. No Connection
5. Input +
6. Input -
7. Output +
8. Output -

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	17mm(0.67")

MODULE CASE



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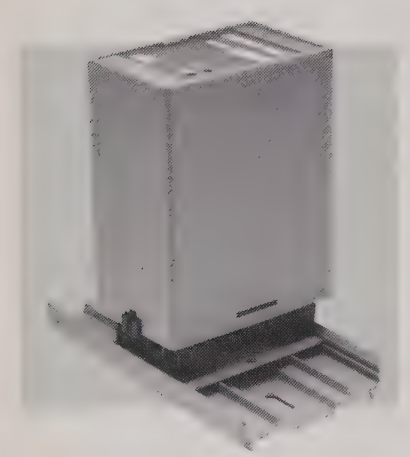
DORIC DATA

AC Transmitter/Signal Conditioning Modules

DP6010/DP6020



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP6010 and DP6020 AC Transmitter/Signal Conditioner modules provide a DC output in proportion to an AC voltage and an AC current input respectively. These modules are ideal system components for centralized, automatic (computer) control of electric-powered equipment (i.e. pumps and blowers). Both model types feature isolation between input and output.

CALIBRATION

The DP6010 and the DP6020 have zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory within ±0.5% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end for required full scale output (adjustment range of each control is typically ±5% of span). Repeat procedure as required.

SPECIFICATIONS

LINEARITY
±0.2%

REPEATABILITY
±0.1% of span.

RESPONSE TIME
< 100 milliseconds.

INPUT LOSS
≤ .5VA

OUTPUT RIPPLE
0.2% RMS of span.

ISOLATION
200Vdc or AC peak.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F)

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

STORAGE TEMPERATURE
-25 to 70°C. (-5 to 175°F)

ZERO AND SPAN ADJUST
±0.015% per degrees C.

WARM-UP TIME TO SPEC
15 minutes.

POWER
100Vac, 120Vac, 240Vac, 24Vdc. 3 watts typical.

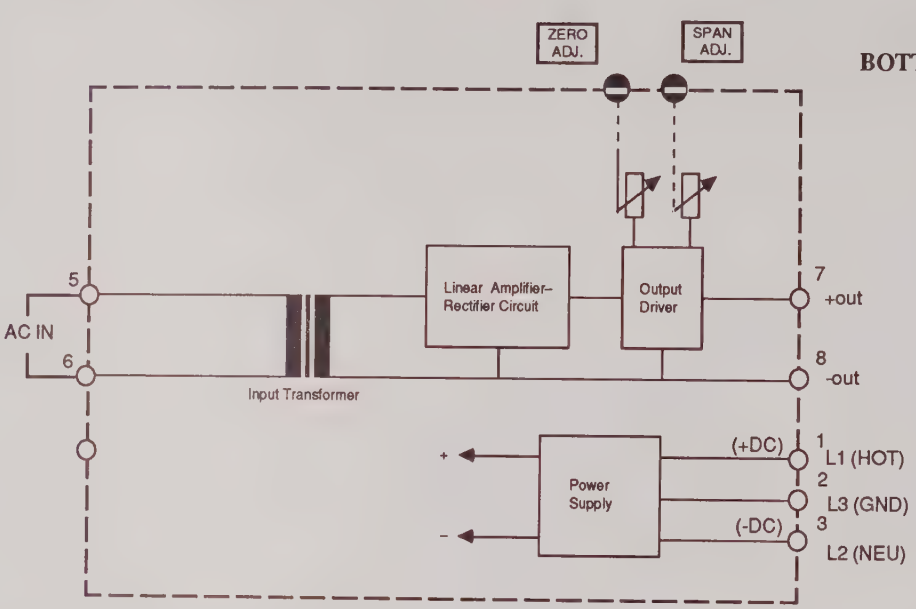
INPUT IMPEDANCE
Voltage Input: > 1MΩ.
Current Input: 200mV shunt equivalent.

OUTPUT IMPEDANCE
Voltage Output: <10Ω.
Current Output: > 2MΩ.

OUTPUT DRIVE
Voltage Output: 10mA.
Current Output: 15V drop. (750Ω load).

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

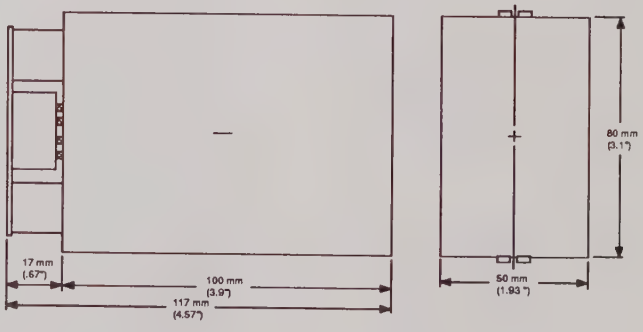
PIN CONNECTION

1. **Line Power**
2. **Ground**
3. **Line Power**
4. **No Connection**
5. **Input**
6. **Input**
7. **Output +**
8. **Output -**

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	68mm(2.75")

MODULE CASE



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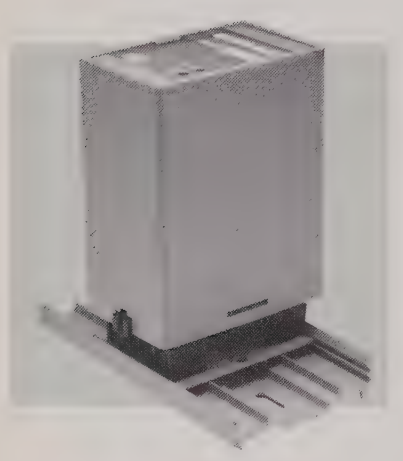
DORIC DATA

Frequency Transmitter Module

DP7010/DP7050



WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

OPERATION

The Model DP7010 and DP7050 Frequency Transmitter Modules provide a DC output in proportion to the frequency of a pulse-train input signal. The input pulse-train is typically generated from a switch or an optical or magnetic transducer for the detection of flow or rotational speed. The DP7010 is available in two input types - on/off input pulse (dry contact) and voltage input pulse. The DP7050 is a very low frequency input module. Inputs from 1Hz to 50Hz are available with this model.

CALIBRATION

The DP7010 and the DP7050 have zero and span calibration adjustment controls at the top of the module. Calibration is set at the factory within ±0.5% of full scale from reference input level. If required, use a small screwdriver to adjust **Zero** with input at the low end for required minimum output. Then adjust **Span** with input at the high end for required full scale output (adjustment range of each control is typically ±5% of span). Repeat procedure as required.

SPECIFICATIONS

LINEARITY
±0.3% of span.

REPEATABILITY
±0.1% of span.

RESPONSE TIME
≈2 s, 0-50 Hz input range
≈1 s, 0-100 Hz input range
≈0.5 s, 0-10 kHz input range

INPUT
Voltage: 2-50 V p-p.

REQUIRED PULSE WIDTH
≥ 0.15 milliseconds.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F)

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

STORAGE TEMPERATURE
-25 to 70°C. (-5 to 175°F)

WARM-UP TIME TO SPEC
15 minutes.

ZERO AND SPAN DRIFT
±0.015% per degrees C.

POWER
100Vac, 120Vac, 240Vac,
24Vdc. 3 watts typical.

INPUT IMPEDANCE
Voltage Input: > 1MΩ.
Current Input: 200mV shunt equivalent.

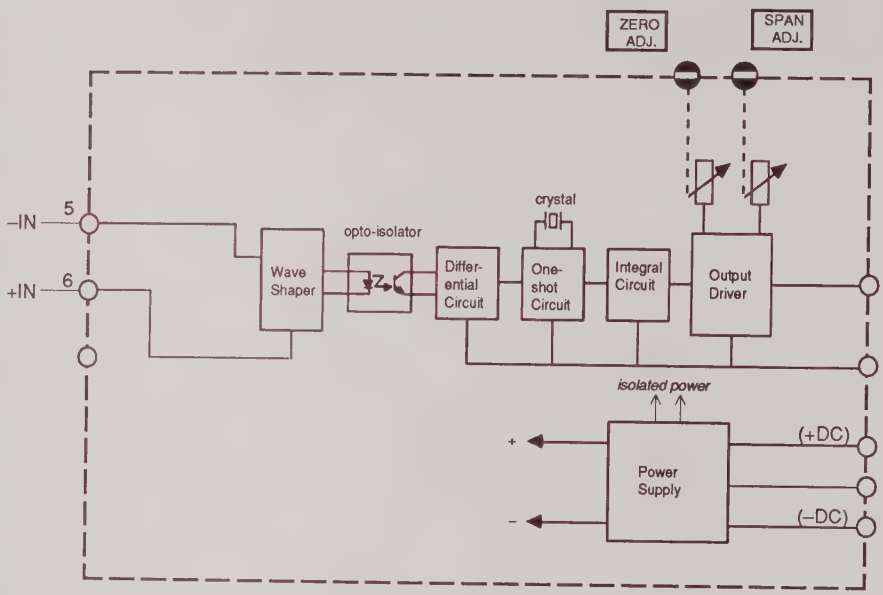
OUTPUT IMPEDANCE
Voltage Output: <10Ω.
Current Output: > 2MΩ.

OUTPUT DRIVE
Voltage Output: 10mA.
Current Output: 15V drop. (750Ω load).

OUTPUT RIPPLE
±0.2% RMS of span.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

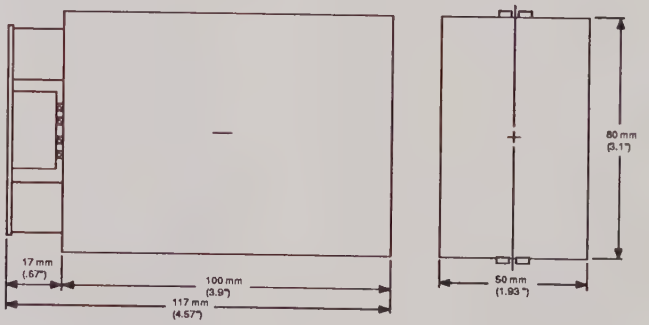
PIN CONNECTION

1. **Line Power**
2. **Ground**
3. **Line Power**
4. **No Connection**
5. **Input +**
6. **Input -**
7. **Output +**
8. **Output -**

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	68mm(2.75")

MODULE CASE



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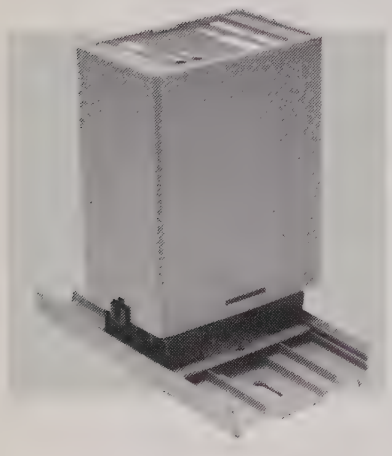
DORIC DATA

DC Power Supply Module

DP9046



OPERATION

The Model DP9046 DC Power Supply Module is designed for two-wire loop transmitter power. The 24Vdc output can be used in an intrinsically safe system and the 40Vdc output can be used in other systems where intrinsic safety is not required.

The DP9046 can be used as a general purpose power supply for any application requiring 24Vdc or 40Vdc power. (Slave relays, alarms, etc.). The DP9046 can power up to three 4 to 20mA current loops or a single 10 to 50mA current loop.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

SPECIFICATIONS

OPERATING TEMPERATURE
-5 to 60°C.
(20 to 140°F).

STORAGE TEMPERATURE
-20 to 80°C.
(-5 to 175°F).

OPERATING HUMIDITY
Less than 90% RH
(non-condensing).

POWER
100Vac, 120Vac, 240Vac,
24Vdc (specify).
4 watts maximum.

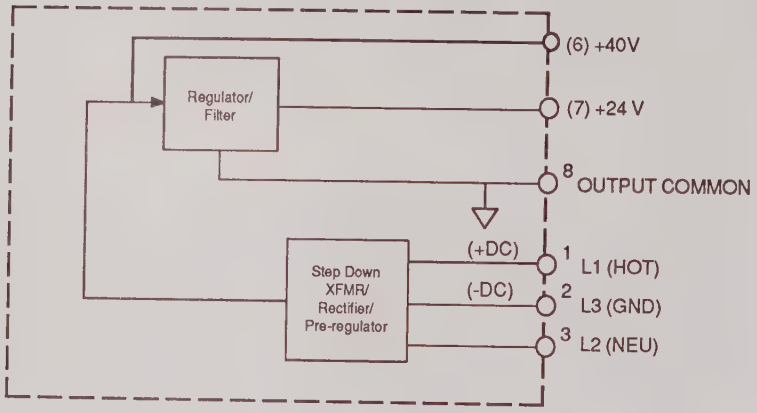
OUTPUT VOLTAGE
24Vdc ±5% and
40Vdc unregulated.

OUTPUT CURRENT
65mA @ 24Vdc,
maximum.

OUTPUT RIPPLE
0.1V peak to peak,
maximum.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

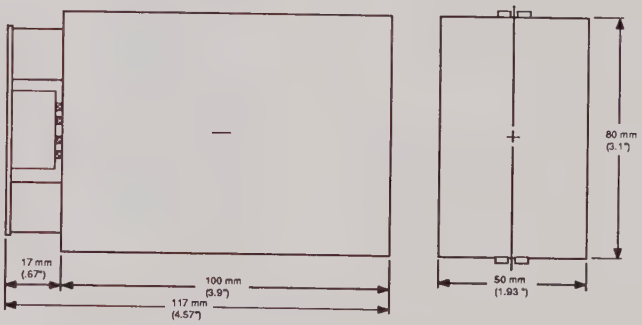
PIN CONNECTION

1. **Line Power**
2. **Ground**
3. **Line Power**
4. **No Connection**
5. **No Connection**
6. **Output + 40Vdc**
7. **Output + 24Vdc**
8. **Output Common**

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	17mm(0.67")

MODULE CASE



DORIC

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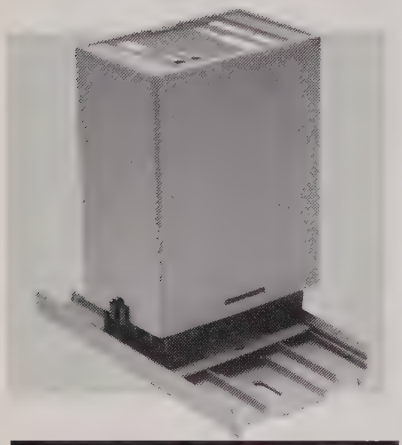
Adjustable Power Supply

DP9050



OPERATION

The DP9050 is a highly stable power supply. The DP9050 can be used as a strain-gauge excitation power supply or any other application where a precise, stable voltage is required.

CALIBRATION

Connect the DP9050 up to the desired load and adjust the trim pot for the desired voltage.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

SPECIFICATIONS

OUTPUT IMPEDANCE
Voltage:
1Ω.

OUTPUT DRIVE
Voltage:
50mA maximum.

STABILITY
Better than 0.015% of span per °C.

OPERATING TEMPERATURE
-5 to 60°C. (20 to 140°F).

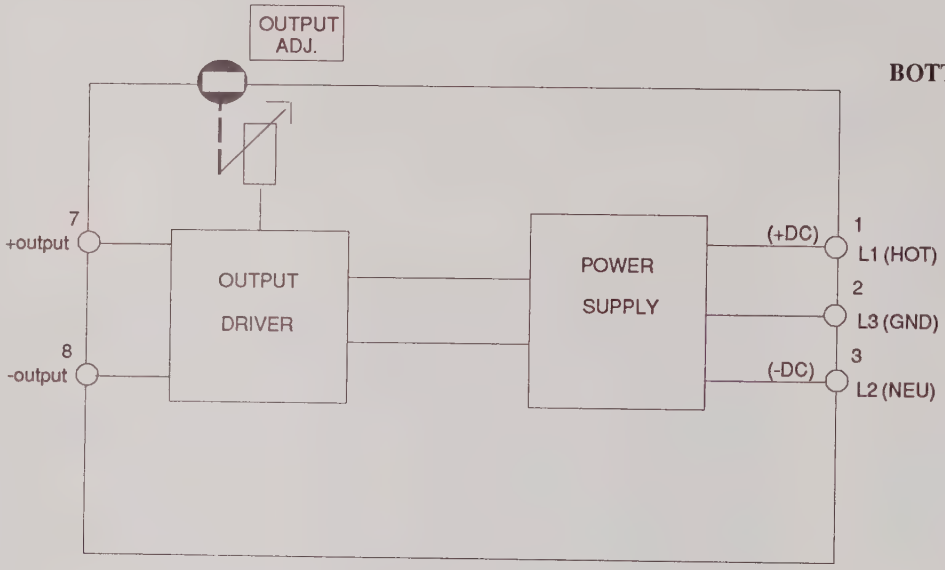
STORAGE TEMPERATURE
-20 to 80°C. (-5 to 175°F).

POWER
100Vac, 120Vac, 240Vac, 24Vdc. (specify).
4 watts maximum.

ADJUSTMENT
3 to 15Vdc @ 50mA.
5 to 30Vdc @ 50mA.

Specifications subject to change without notice.

BLOCK CIRCUIT DIAGRAM



BOTTOM OF 8-PIN MODULE

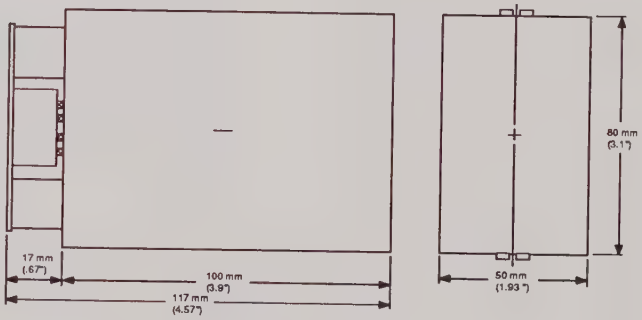
PIN CONNECTION

1. Line Power
2. Ground
3. Line Power
4. No Connection
5. No Connection
6. No Connection
7. Output +
8. Output -

Socket Mounting Dimensions

Dimensions	8-pin
Mounting Hole-to-Hole	43mm(1.7")
Socket Width	51mm(2.0")
Socket Height	17mm(0.67")

MODULE CASE



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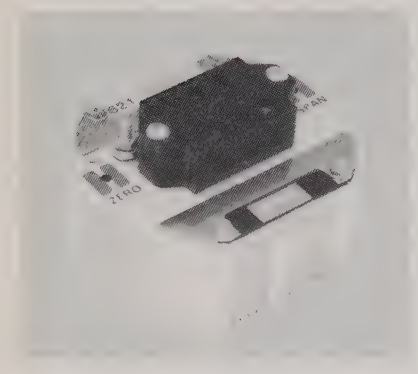
Two-Wire Signal Current Isolator

DT-600



OPERATION

The Doric DT-600 Signal Current Isolator is a highly effective solution to different ground potentials that influence the reliability or accuracy of transferred signals.

Featuring versatile mounting configurations and total current to current signal isolation, this two-wire signal converter has been designed to break the galvanic path between a transmitted signal source and a receiving device such as a controller or recorder.

The DT-600 doesn't require a dedicated power supply; instead it derives its operating potential from the existing loop current. In a process instrumentation two-wire system, the isolator is placed in series with the drive signal and provides an output current that is proportional to the input signal current.

When adding a signal isolation device, it becomes important to consider the voltage drop or additional line resistance that will be placed in the system.

The DT-600 design features a maximum fixed voltage drop of 5.5Vdc (8.5V for 10-50mA) which remains constant over the entire temperature range of -28°C to +82°C (-20°F to +180°F).

CALIBRATION

Set input to 50% of full scale Span. (i.e. 12mA for 4-20mA models) Adjust **"Trim"** potentiometer until output exactly matches the input current level. The DT-600 will now track the input through Zero and Span in a linear fashion.

FEATURES

Complete Isolation:
Prevents Ground Loops.

Standard Outputs:
4-20mA or 10-50mA ranges.

Current Loop Excitation:
Transient and Reverse Polarity Protected.

High Accuracy and Stability:
Linearity Better Than ±.05%FS.

SPECIFICATIONS

INPUT
Range: 4-20mA.
Optional range: 10-50mA.

ADJUSTMENT
Trim: Adjust output span ±1%.
Load factor: (4-20mA) 5.5Vdc output shorted; (10-50mA) 8.5Vdc, output shorted.

OUTPUT
Current: 4-20mA into 0-250Ωs. 10-50mA into 0-100Ωs.

LINEARITY
Better than ±0.05% of full scale.

STABILITY
Zero: ±0.01% of span per °C.
Span: ±0.005% of span per °C.

LOOP INTEGRITY PROTECTION
The transmitter is protected by a zener diode which limits the maximum voltage drop across the unit in the event that the output load is accidentally disconnected.

The output impedance should not exceed 250Ωs maximum for 4-20mA (100Ωs maximum for 10-50mA) under any condition. In the event of an open output circuit, the input loop voltage drop will be limited to 15 volts.

OPERATING TEMPERATURE
-28.8 °C to +82.2 °C.
(-20 °F to +180 °F).

ISOLATION
500Vdc or AC peak.

POWER
Current loop excitation 4mA @ 5.5Vdc.

CERTIFICATION
Approved for hazardous locations, Class I, Group D; Class II, Groups E,F & G; and Class III.

WEIGHT
141.5 grams (5oz.), without explosion-proof enclosure 1.36 kilograms (3 lb.), approximate, with explosion-proof enclosure. (MDL E2LS)

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS
(with DM910 surface mount plate)

*NOTE: Crimp-lug for ground (earth)

Terminal Block Designations
Model DT-600

1	+IN*	4	-OUT*
2	+OUT*	5	
3	-IN*	6	

Abbreviations:

IN* = Signal input & power supply
OUT* = Signal output

H = 1.68"(42.7mm)

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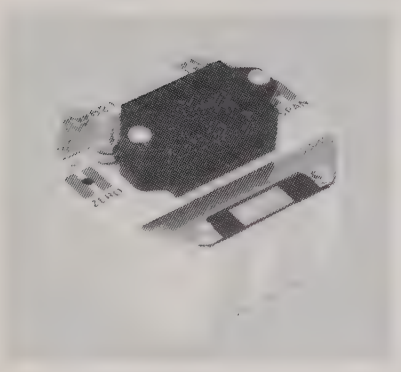
Wide-Ranging Digital Indicator

DT600D



OPERATION

The Doric DT-600D is a loop powered current-to-digital display indicator. It accepts either 4-20mA or 10-50mA current and generates a 3-1/2 active digit liquid crystal digital display in 0.35" black numerals, with a selectable trailing dummy zero for scaling purposes.

The display can be custom scaled to the user's requirements in percent or directly in engineering units for such parameters as pressure, temperature and flow.

The DT-600D is functionally based on a 2000-count, dual slope, integrating analog-to-digital converter designed to reject interference signals normally found in industrial measurement environments.

The DT-600D is available in a compact Hockey Puck housing. It fits easily in an explosion-proof enclosure and can be mounted in a variety of field locations, including hazardous areas.

CALIBRATION

The **Zero** and **Span** adjustments can be turned through normally sealed openings in the front panel. Changes can be readily made in Input Range, Zero Offset, Decimal Point Position, Polarity and Display Range by slipping the unit out of its case and rearranging plug jumpers on the PC boards. (See DT-600D field calibration sheet).

Front Panel Adjustments: Adjustable with multiturn potentiometers. **Zero** and **Span** adjustments are used in conjunction with jumper settings and selected Offset and Span ranges to set up the unit for any desired configuration within the active operating range, ±1 count.

FEATURES

Wide-Ranging Display:
Field Selectable.

Direct Reading LCD Indicator:
0.35" High Black Numerals.

Loop Powered:
Voltage Drop 2.5 Volts Maximum.

SPECIFICATIONS

INPUT

Current:
4-20mA or 50mA, plug jumper selectable.

Voltage Drop:
2.5 volts maximum.

Protection:
Maximum forward current overload: 0.2 amps; Maximum reverse current: 1.0 amps; Surge current: 2 amps for 2 microseconds maximum, non-repetitive.

COMMON MODE REJECTION
120dB.

DISPLAY

Type:
LCD, 0.35" high black digits over reflective background.

Format:
3-1/2 active digits with selectable trailing dummy zero for scaling purposes.

Range:
+19990 to -19990 (includes dummy zero).

Decimal Points:
3 positions, jumper plug selectable.

Overrange:
3 least significant active digits blank out.

Rate:
2-1/2 readings per second.

Zero offset:
Zero may be offset by -2500 to +2500 counts (including dummy zero).

Span Range:
Can display any zero offset and span to a maximum of 3-1/2 digit resolution (2000 counts). Continuously adjustable up to 2000 counts from Zero Offset. (Example: If Zero Offset is -250, Span can range from -250 to +1750).

LINEARITY
±0.1% of span ±1 count.

OPERATING TEMPERATURE
-40 °C to +85 °C
(-40 °F to +185 °F).

STABILITY
±0.005% of span per °C typical.
±0.01% of span per °C maximum.

POWER INPUT
Unit operating power is obtained directly from the signal input current loop.

Specifications subject to change without notice.

WARRANTY

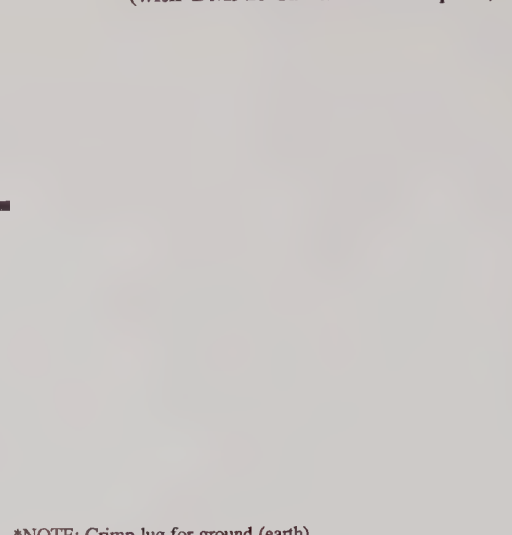
All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)



*NOTE: Crimp-lug for ground (earth)

Terminal Block Designations
Model DT-600D

1		4	
2		5	+IN
3		6	-IN

Abbreviations:
IN = Signal input

H = 1.95"(50mm)

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Telex 249031
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DC Isolating Two-Wire Transmitter

DT-601

CALIBRATION

If calibration is required, set the input to minimum and adjust **Zero** for minimum output. Set the input at maximum and adjust **Span** for maximum output. Repeat as required.

FEATURES

Computer Interface:
Low Ripple, 4-20mA Output.
Complete Isolation:
Prevents Ground Loops.
Certification:
CSA.

OPERATION

The Doric Model DT-601 2-wire transmitter accepts a DC level input from any grounded or ungrounded source. Output is a proportional high level current signal, 4-20mA or optional 10-50mA. Low output ripple meets the requirements for input to a process computer. In a typical application the unit interfaces a gas analyzer, pH meter, or DC current shunt to recording, monitoring, or controlling instruments.

The DT-601 minimizes the problems normally associated with DC process signals:

1) Complete isolation prevents false signals due to loop currents;

2) Extremely high (100dB) common mode noise rejection ratio, offers 100 times the protection of the typical unit specified at 60dB;

3) Single-ended DC amplifier input design keeps bias leakage current in the nano-amp range to limit bias signal error when long lengths of input wire must be run.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 °C to +82 °C (-20 °F to 180 °F).

OUTPUT
4-20mA (limited to 30mA maximum)
10-50mA (limited to 65mA maximum)

LINE VOLTAGE CHANGE EFFECT
±0.002% of span per Vdc change.

POWER
12Vdc (minimum)
42Vdc (maximum, limit imposed by CSA)
Over voltage 60Vdc (maximum) without damage. All voltages measured at output terminals.

OUTPUT RIPPLE
Less than 20mV peak to peak @ maximum load.

LOAD CAPABILITY

$$R_{(load)} = \frac{E-12}{I}$$

Where:
E = 12-42V (60V)
I = 4-20mA (10-50mA)
$R_{(load)}$ = Loop resistance

COMMON MODE REJECTION
Greater than 100dB @ 50Hz.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 1% of span.

ZERO AND SPAN ADJUSTMENTS
±10% of span.

INPUT IMPEDANCE
Greater than 1MΩ.

STABILITY
0.02% of span per °C.

RESPONSE TIME
100 milliseconds.

REPEATABILITY
±0.1% of span.

LINEARITY
±0.1% of span.

ISOLATION
500Vdc or AC peak.

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)

*NOTE: Crimp-lug for ground (earth)

Terminal Block Designations
Model DT-601

1	+PS	4	-IN
2	+IN	5	
3	-PS	6	

Abbreviations:

PS = Power supply and current output
IN = Signal input

H = 2.12"(53.8mm)

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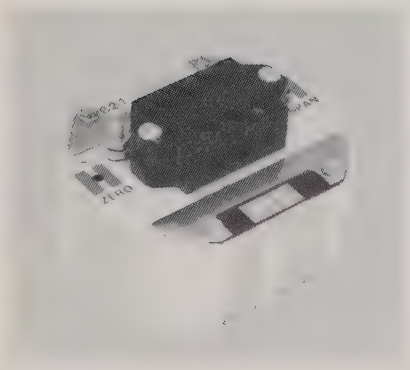
Square Root Extractor

DT-605



OPERATION

The DT-605 Square Root Extractor produces an output that is proportional to the actual flow rate by computing the square root of the differential pressure and producing a linear flow output signal.

The DT-605 does not require external power, but derives operating potential from existing loop current when placed in series with the drive signal from a 2-wire d/p transmitter.

Tests show that the DT-605 does not degrade accuracy or resolution specifications of commonly used d/p transmitters. In part, this is achieved because the DT-605 is a continuous square root computer which does not employ the curve segment biased diode technique.

The graph indicates the linear flow output measured with respect to the differential pressure input. The actual output of the DT-605 can be calculated by using the equation (see back page "Loop Connection Diagram").

CALIBRATION

The DT-605 comes factory adjusted. If calibration is required, set input to 1% of span, then adjust "IN" **Zero** pot for 10% of span output. Set the input to 25% of span, then adjust "OUT" **Zero** pot for 50% of span output. Set the input to maximum, then adjust **Span** pot for maximum output. Repeat as required.

FEATURES

Continuous Square Root Extraction:
Infinite resolution.

Current Loop Excitation:
Loop powered.

D/P Input:
Linear flow output.

Versatile Mounting:
Snap-track or explosion-proof housing.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 to 82 °C.
(-20 to 180 °F).

OUTPUT
4-20mA into 300Ωs maximum.

POWER
Current loop powered.
6V drop.

STABILITY
Better than 0.05% of span below 10% of input.
Better than 0.02% of span above 10% of input.

ACCURACY
Better than 0.1% of span above 1% of input.

LOAD RESISTANCE

$$R_{load} = \frac{Vsupply - 6Vdc - Vinput}{20mA}$$

Vsupply = 24Vdc
Vinput = 12Vdc based on average d/p transmitter supply.

RFI EFFECT
(465 MHz, 10V per meter).
Less than 2% of span.

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS
(with DM910 surface mount plate)

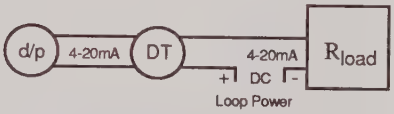
*NOTE: Crimp-lug for ground (earth)

H = 1.68"(42.7mm)

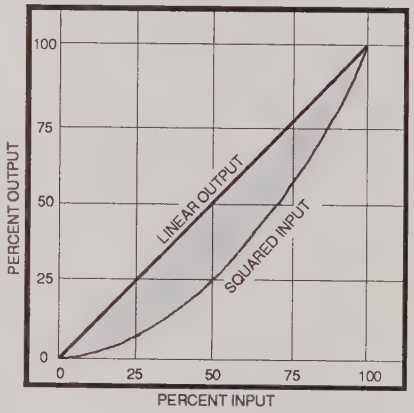
Terminal Block Designations
Model DT-605

1	+OUT	4	-IN
2	+IN	5	
3	-OUT	6	

Abbreviations:
IN = Signal input
OUT = Power supply and current output



Loop Connection Diagram



$$I_{out} = 16 \times \sqrt{\frac{I_{in} - 4}{16}} + 4$$

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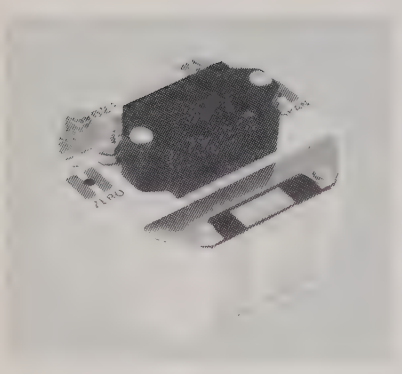
DORIC DATA

Two-Wire RTD Transmitter
DT-610



FEATURES

True Lead Length Compensation:
Allows for long leadwires.

High Accuracy:
±0.1% of span linear to temperature.

Low Excitation Current:
Reduces self-heating of RTD element.

OPERATION

The DT-610 is a two-wire transmitter designed to convert a **Resistance Temperature Device (RTD)** to a usable current loop signal. The DT-610 accepts two or three-wire RTD's and includes constant current excitation as well as true lead wire compensation. These features allow the DT-610 to be located at a considerable distance from the RTD.

Because the DT-610 is linear to temperature, it can be wired directly into devices such as chart recorders, controllers, and meters. The DT-610 is completely housed in a extruded aluminum case which inherently protects the unit from radio frequency interference, even when not installed in conduit housing. All internal parts have conformal coating for added protection from moisture and corrosion. The rugged two-wire design of the DT-610 makes it ideal for many temperature monitoring applications.

CALIBRATION

If calibration is required, set the input to minimum and adjust **Zero** for minimum output. Set the input at maximum and adjust **Span** for maximum output. Repeat as required.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 °C to +82 °C (-20 °F to 180 °F).

OUTPUT
4-20mA (limited to 30mA maximum)
10-50mA (limited to 65mA maximum)

LINE VOLTAGE CHANGE EFFECT
±0.002% of span per Vdc change.

POWER
12Vdc (minimum)
42Vdc (maximum, limit imposed by CSA)
Over voltage 60Vdc (maximum) without damage. All voltages measured at output terminals.

OUTPUT RIPPLE
Less than 20mV peak to peak @ maximum load.

LOAD CAPABILITY

$$R_{(load)} = \frac{E-12}{I}$$

Where:
E = 12-42V (60V)
I = 4-20mA (10-50mA)
$R_{(load)}$ = Loop resistance

COMMON MODE REJECTION
Greater than 100dB @ 50Hz.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 2% of span maximum.

ZERO AND SPAN ADJUSTMENTS
±10% of span.

STABILITY
Better than 0.02% of span per °C.

RESPONSE TIME
Less than 200 milliseconds.

REPEATABILITY
Better than ±0.1% of span.

LINEARITY
Better than ±0.1% of span linear to temperature.

EXCITATION CURRENT
1mA maximum.

LEADWIRE RESISTANCE
Less than 50Ωs per wire.

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)

*NOTE: Crimp-lug for ground (earth)

Terminal Block Designations
Model DT-610

1	+PS	4	B
2	A	5	
3	-PS	6	C

Abbreviations:

PS = Power supply and current output

A
B
C — RTD inputs

H = 1.68"(42.7mm)

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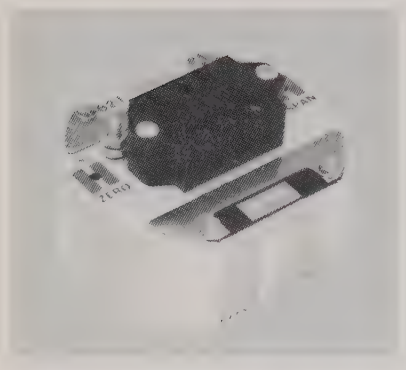
Two-Wire Thermocouple Transmitter
DT-621



The DT-621 is available in the compact aluminum housing which is ideal for high-density installations. The DT-621 slips into an explosion-proof enclosure with-out drilling or tapping.

CALIBRATION

If calibration is required, set the input to minimum and adjust **Zero** for minimum output. Set the input at maximum and adjust **Span** for maximum output. Repeat as required.

FEATURES

Direct Thermocouple Input:
Reference compensated, all standard TCs.

High Density Installation:
Hockey puck.

Complete Isolation:
Assures high accuracy, eliminates ground loops.

Standard Process Signals:
4-20mA or 10-50mA current output.

OPERATION

The Doric DT-621 two-wire Thermocouple Transmitter accepts millivolt input from any standard ISA thermocouple. Output is a proportional 4-20mA or 10-50mA current signal.

Low output ripple makes the DT-621 well suited for input to a process computer. Typical application, however, is to interface a thermocouple with recording, monitoring, or controlling instruments.

The advanced circuitry of the DT-621 minimizes the problems associated with temperature measurement via thermocouple:

1)Compensation for changes in the reference junction, temperature is automatic;

2)Complete isolation prevents false signals due to ground loop currents;

3)Extremely high common mode rejection offers protection that exceeds typical 60dB specification;

4)The low leakage single-ended input amplifier eliminates offset error over the operating temperature range even when thermocouple extension wires are used.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 °C to +82 °C (-20 °F to 180 °F).

OUTPUT
4-20mA (limited to 30mA maximum)
10-50mA (limited to 65mA maximum)

LINE VOLTAGE CHANGE EFFECT
±0.01% of span per Vdc change.

POWER
12Vdc (minimum)
42Vdc (maximum, limit imposed by CSA)
Over voltage 60Vdc (maximum) without damage. All voltages measured at output terminals.

OUTPUT RIPPLE
Less than 20mV peak to peak @ maximum load.

LOAD CAPABILITY

$$R_{(load)} = \frac{E-12}{I}$$

Where:
E = 12-42V (60V)
I = 4-20mA (10-50mA)
$R_{(load)}$ = Loop resistance

COMMON MODE REJECTION
Greater than 100dB @ 60 Hz.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 2% of span maximum.

ZERO AND SPAN ADJUSTMENTS
±10% of span.

INPUT IMPEDANCE
Greater than 1MΩ.

STABILITY
Better than 0.02% of span per °C.

RESPONSE TIME
100 milliseconds.

REPEATABILITY
Better than ±0.1% of span.

LINEARITY
Better than ±0.1% of span.

ISOLATION
500Vdc or AC peak.

BURNOUT PROTECTION
Upscale burnout standard.

COLD JUNCTION COMPENSATION ERROR
2 °C maximum error per 100 °C ambient temperature change.

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)

*NOTE: Crimp-lug for ground (earth)

Terminal Block Designations
Model DT-621

1	+PS	4	-IN
2	+IN	5	
3	-PS	6	

Abbreviations:

PS = Power supply and current output
IN = Signal input

H = 2.12"(53.8mm)

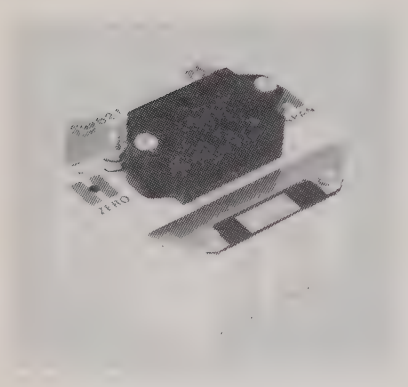
Represented by:

DORIC SCIENTIFIC DIVISION
Emerson Electric Company
3883 Ruffin Road
San Diego, CA 92123-1898

In CA (619) 565-4415
Toll free (800) 854-2708
Telex 249031
Cable AUTOZERO SAN DIEGO

Two-Wire Potentiometer Transmitter

DT-650



FEATURES

Wide Input Range:
100Ω to 10KΩs.

High Density Installation:
Compact hockey puck.

High Accuracy:
±0.1% of span.

OPERATION

The DT-650 is useful in applications where slidewire or other potentiometer type devices are incorporated. Typical applications include: Level measurement; Valve positioning; Linear displacement; etc.

The versatile input circuit allows any potentiometer between 100Ω and 10kΩs to be connected to the input.

The DT-650 provides a voltage style excitation to the potentiometer and conditions the signal returned from the wiper to a proportional 4-20mA or 10-50mA signal.

CALIBRATION

If calibration is required, set the potentiometer to minimum and adjust **Zero** for minimum output. Then set the potentiometer at maximum and adjust **Span** for maximum output. Repeat as required.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 °C to +82 °C (-20 °F to 180 °F).

OUTPUT
4-20mA (limited to 30mA maximum)
10-50mA (limited to 65mA maximum)

LINE VOLTAGE CHANGE EFFECT
±0.002% of span per Vdc change.

POWER
12Vdc (minimum)
42Vdc (maximum, limit imposed by CSA)
Over voltage 60Vdc (maximum) without damage. All voltages measured at output terminals.

OUTPUT RIPPLE
Less than 20mV peak to peak @ maximum load.

LOAD CAPABILITY

$$R_{(load)} = \frac{E-12}{I}$$

Where:
E = 12-42V (60V)
I = 4-20mA (10-50mA)
$R_{(load)}$ = Loop resistance

COMMON MODE REJECTION
Greater than 100dB @ 60Hz.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 2% of span maximum.

ZERO AND SPAN ADJUSTMENTS
±10% of span.

STABILITY
Better than 0.02% of span per °C.

RESPONSE TIME
Less than 200 milliseconds.

REPEATABILITY
Better than ±0.1% of span.

LINEARITY
Better than ±0.1% of span.

EXCITATION VOLTAGE
0.1V typical.

Specifications subject to change without notice.

WARRANTY

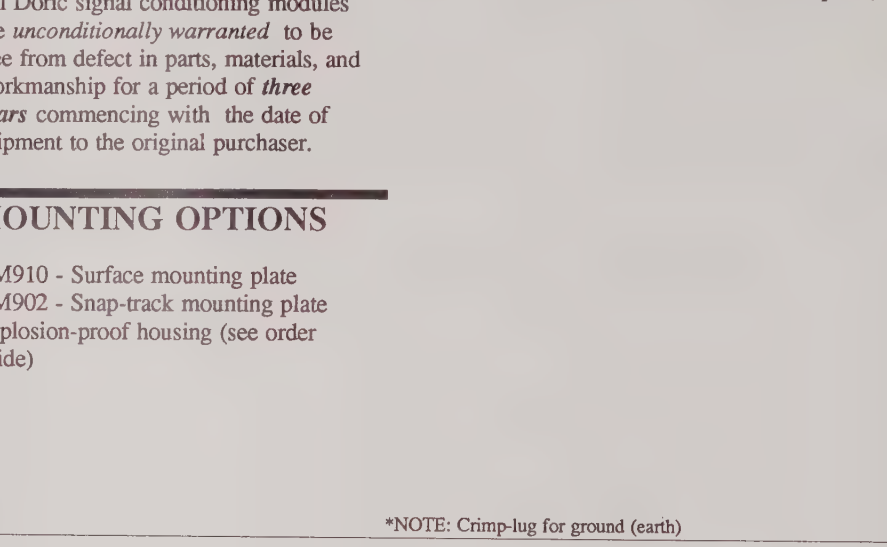
All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)



H = 1.68"(42.7mm)

Terminal Block Designations
Model DT-650

1	+PS	4	W
2	CCW	5	
3	-PS	6	CW

Abbreviations:

PS = Power supply and current output

Potentiometer Input:
CCW = Counterclockwise
W = Wiper
CW = Clockwise

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Telex 249031
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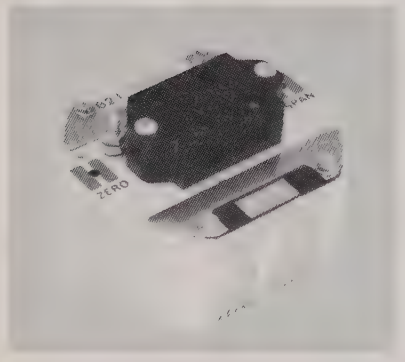
Two-Wire AC Current Transmitter

DT-661



FEATURES

Direct 5 amp Inputs

Low Output Ripple:
10mV P/P maximum.

Input/Output Isolation:
500Vdc or AC peak.

Three Year Warranty

OPERATION

The Doric Model DT-661 two-wire AC transmitter accepts standard process current or voltage input signals. The unit accepts 0-5 amp input from a current transformer or a range of voltages from potential transformers.

For safety, a toroidal transformer steps down the standard 0-5 amp AC current to 0-5 milliamps. This transformer also isolates the input and enables the Model DT-661 to withstand large monetary surges of input current.

Span and Zero adjustments are made with multiturn potentiometers on the front panel. The Model DT-661 has very low ripple, and is compatible with both analog and digital monitoring and control instrumentation.

CALIBRATION

Set the input to 10% of full scale and adjust **Zero** pot for 10% output. Set the input to full scale and adjust **Span** pot for full scale output. Repeat as required.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 to 82 °C (-20 to 180 °F).

OUTPUT
4-20mA (limited to 30mA maximum).
10-50mA (limited to 65mA maximum).

LINE VOLTAGE CHANGE EFFECT
±0.002% of span per Vdc change.

POWER
12Vdc (minimum)
42Vdc (maximum, limited imposed by CSA).
Over voltage 60Vdc (maximum) without damage.
All voltages measured at output terminals.

OUTPUT RIPPLE
Less than 10mV peak to peak @ maximum load.

LOAD CAPABILITY

$$R_{load} = \frac{E - 12}{I}$$

Where:
E = 12 to 42V(60V)
I = 4 to 20mA (10-50mA)
R_{load} = Loop resistance.

COMMON MODE REJECTION
Greater than 100dB @ 50Hz.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 2% of span.

ZERO AND SPAN ADJUSTMENTS
±10% of span.

INPUT IMPEDANCE
Current: 0.1Ω.
Voltage: Greater than 100kΩs.

STABILITY
Better than 0.015% of span per °C.

RESPONSE TIME
Less than 200 milliseconds.

REPEATABILITY
Better than 0.2% of span.

LINEARITY
Better than 0.2% of span.

ISOLATION
500Vdc or AC peak.

OVERLOAD CAPABILITY
Current: 20 amps maximum.
Voltage: 150% overvoltage.

INPUT FREQUENCY
40 to 100Hz.

INPUT CUTOUT
5% of span.

Specifications subject to change without notice.

WARRANTY

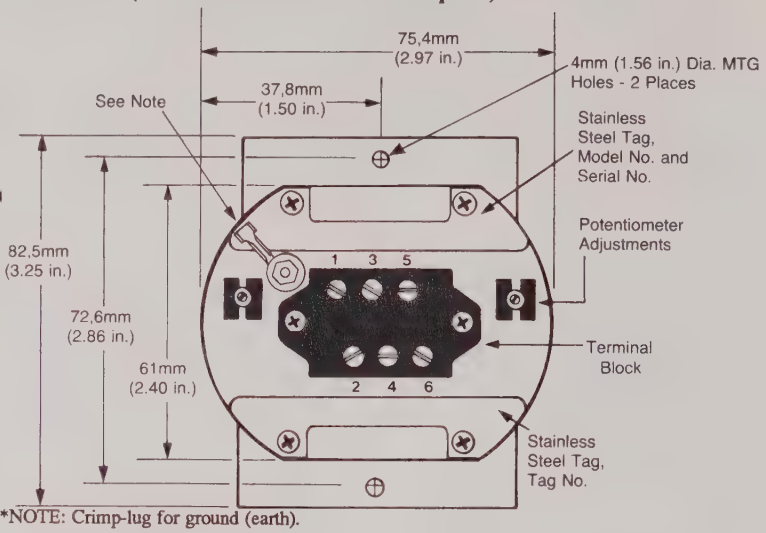
All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

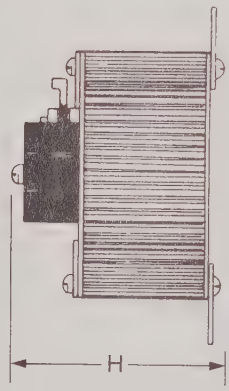
DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)



*NOTE: Crimp-lug for ground (earth).



H = 2.12"(53.8mm)

Terminal Block Designations

Model DT-661

1	+PS	4	CT/PT
2	CT/PT	5	
3	-PS	6	

Abbreviations:

PS = Power supply and current output
CT/PT = Current transformer or potential transformer.

DORIC

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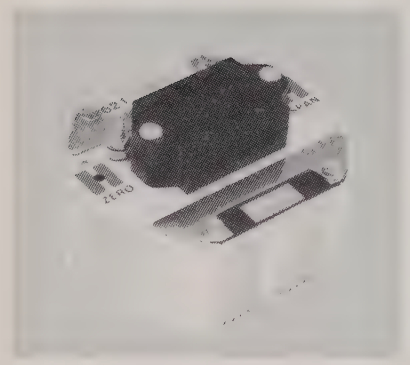
DORIC DATA

Frequency-to-DC Transmitter

DT-671



FEATURES

Convenient Frequency Range Selection:
Wide turn down. Adjustment 50%.

High Density Installation:
Hockey puck.

Crystal Timed Stability:
±0.02% per °C.

OPERATION

The Doric Model DT-671 frequency is a two-wire transmitter designed to convert varying frequencies to signal levels more suitable for field transmission in analog control systems.

The DT-671 typically receives input from a turbine or a positive displacement meter and provides a proportional 4-20mA or 10-50mA output. It features exceptional stability under adverse field conditions due to a unique quartz-crystal time-base design. The DT-671 has a transformer coupled input.

Incorporating a wide turn down adjustment, the DT-671 can be turned down to 50% of its full scale rated input frequency allowing maximum flexability in field calibration. Ranges from 50Hz to 6.4kHz full scale are obtainable through field calibration.

CALIBRATION

If calibration is required, set the input to minimum and adjust **Zero** for minimum output. Set the input at maximum and adjust **Span** for maximum output. Repeat as required.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 to 82 °C (-20 to 180 °F).

OUTPUT
4-20mA (limited to 30mA maximum).
10-50mA (limited to 65mA maximum).

LINE VOLTAGE CHANGE EFFECT
±0.003% of span per Vdc change.

POWER
12Vdc (minimum).
42Vdc (maximum, limit imposed by CSA).
Overvoltage 60Vdc (maximum) without damage.
All voltages measured at output terminals.

OUTPUT RIPPLE
Less than 20mV peak to peak @ maximum span.

LOAD CAPABIY

$$R_{load} = \frac{E - 12}{I}$$

Where:
E = 12 to 42V(60V)
I = 4-20mA (10-50mA)
R_{load} = Loop resistance.

COMMON MODE REJECTION
Greater than 60dB @ 50Hz.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 2% of span.

ZERO AND SPAN ADJUSTMENTS
Zero: 0 to 10% of input range.
Span: 50 to 100% of input range.

INPUT IMPEDANCE
5kΩs.

STABILITY
Better than 0.02% of span per °C.

RESPONSE TIME
Less than 500 milliseconds.

REPEATABILITY
Better than 0.1% of span.

LINEARITY
Better than 0.1% of span.

ISOLATION
500Vdc or AC peak.

INPUT VOLTAGE
10mV to 20V peak to peak.
(No DC offsets).

Specifications subject to change without notice.

WARRANTY

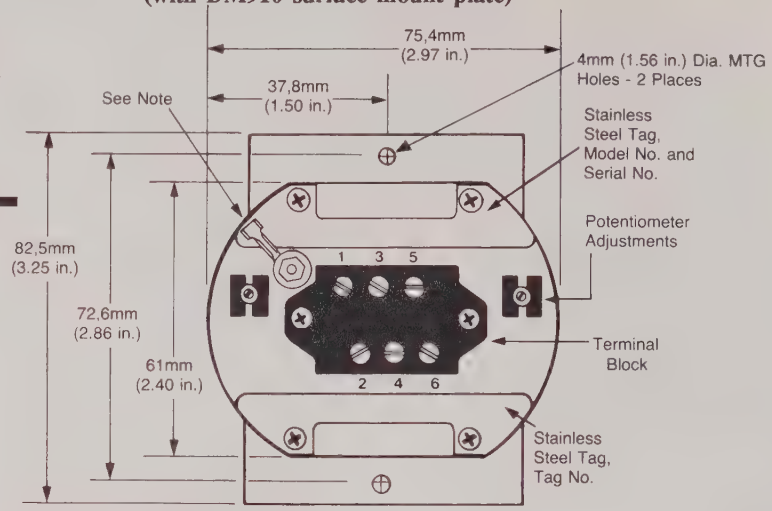
All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

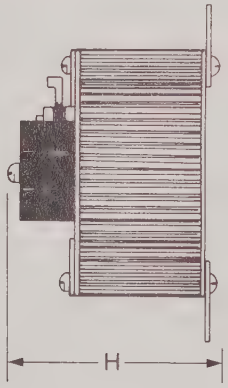
DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)



*NOTE: Crimp-lug for ground (earth).



H = 1.95"(50mm)

Terminal Block Designations

Model DT-671

1	+PS	4	
2	IN	5	
3	-PS	6	IN

Abbreviations:

PS = Power supply and current output
IN = Signal input

DORIC

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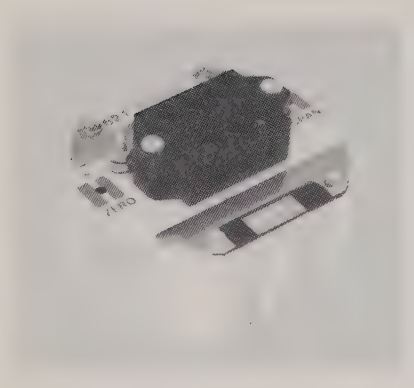
Two-Wire Integrating Totalizer

DT-675D



CALIBRATION

The DT-675D is calibrated at the factory to customer specifications within ±0.1%. Should calibration be required, see DT-675D field calibration instructions.

FEATURES

Square Root or Linear Function:
Field selectable by jumpers

8-Digit Indicator:
Battery back-up---6 months

Full Scale Rates:
6.25 to 51,200 counts per hour.

OPERATION

The Doric DT-675D is a two-wire integrating totalizer capable of square root or linear function integration. The DT-675D is loop-powered and accepts either 4-20mA or 10-50mA current. The DT-675D accumulates a total on an 8-digit LCD 0.315" display.

The display has leading zero suppression, overflow indication, and contains an integral lithium battery that provides a minimum of 6 months display backup in case of loop power failure. The display may be reset through external terminals. Alternatively, the RS option provides an external terminal mounted push button to reset the display.

All possible input and output configurations of the DT-675D model (including square root or linear function) are jumper selectable in the field.

The DT-675D is available in Doric's standard hockey puck housing. The standard unit fits easily in an explosion-proof enclosure and may be mounted in a variety of field locations, including hazardous areas.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 °C to +82 °C
-18 to 70 °C (0 to 160 °F).

LOOP DROP
7V maximum.

COMMON MODE REJECTION
Greater than 60dB @ 50Hz.

RFI EFFECT
(465 MHz, 10Volts per meter)
Less than 1% of selected span.

ZERO AND SPAN ADJUSTMENTS
±10% of selected span.

OVERFLOW
Overflow is indicated by a black dot in the top left corner of the display.

STABILITY
Better than ±0.02% of span per °C.

ACCURACY
Linear mode; ±0.1% of span.
Square root mode; ±0.2% of span.

INPUT
4-20mA or 10-50mA field selectable.

INPUT PROTECTION
400V reversed input polarity.

OUTPUT
6.25 to 51,200 counts per hour; field selectable.
99,999,999 counts maximum.

COUNT DROPOUT
1% of span.

***NOTE:**
Display may non-destructively darken above 55 °C; total will be unaffected.

Specifications subject to change without notice.

WARRANTY

All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)

*NOTE: Crimp-lug for ground (earth)

Terminal Block Designations
Model DT-675D

1	+IN	4	CAL
2	-IN	5	RS
3		6	RS

Abbreviations:

IN = Signal input
RS = Reset
CAL = Calibration

H = 1.95"(5.0mm)

Represented by:

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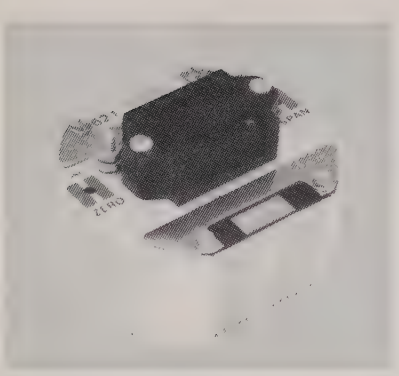
In CA (619) 565-4415
Toll free (800) 854-2708
Telex 249031
Cable AUTOZERO SAN DIEGO

Two-Wire Direct Current Alarm

DT-678



In its compact aluminum housing, the DT-678 is ideal for high-density installations.

CALIBRATION

Set the input for desired trip point. Adjust the setpoint pot until the relay just trips. For models with the "AD" (Adjustable Deadband) option make sure the deadband is set at minimum during calibration.

FEATURES

Stability:
0.02% of span per °C.

Solid-State Relay:
1.5A @ 120Vac or 125Vac.

Complete Isolation:
Input/Output 300Vdc or AC peak.

Relay Status Monitor:
Light emitting diode.

OPERATION

The Doric Model DT-678 two-wire direct current alarm accepts standard process live zero current signals. It features solid-state switching, eliminating burned or welded contacts and providing enhanced reliability.

The DT-678 also eliminates the need for a dedicated power supply and is therefore especially useful where available power is insufficient to run standard four-wire alarms. Loop voltage requirements are as low as 6.3V for 4-20mA or 7.0V for 10-50mA. Still, the DT-678 can control up to 1.5A @ 120Vac or 125Vdc.

The DT-678 offers complete input/output isolation, and its output is selectable (normally open or normally closed). An LED on the face of the unit indicates output status (on/off).

Several options are available on the DT-678 including Adjustable Deadband (option "AD"), which allows the deadband to be adjusted from 1 to 25% of span. Relay Latching (option "MR") is also available. With the latching option, the relay will latch when tripped. The relay is reset by shorting pins numbers three and four.

SPECIFICATIONS

CODE	CONFIGURATION	RELAY STATUS
L1	LO trip, failsafe	Open when tripped
L2	LO trip, standard	Closed when tripped
H1	HI trip, failsafe	Open when tripped
H2	HI trip, standard	Closed when tripped

OPERATING TEMPERATURE
-18 to 65 °C (0 to 150 °F)

COMMON MODE REJECTION
Greater than 60dB @ 50Hz.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 1% of span.

SETPOINT ADJSUTMENT
0 to 100% of span.

STABILITY
±0.02% of span per °C.

RESPONSE TIME
Less than 100 milliseconds.

REPEATABILITY
Better than 0.1% of span.

ISOLATION
300Vdc or AC peak.

POWER
6.3Vdc drop maximum (4-20mA)
7Vdc drop maximum (10-50mA)

DEADBAND
1% typical.

OUTPUT
Type: SPST solid-state relay.
Rating: 1.5A @ 125Vdc or 120Vac.
Indication: LED indicator is on when solid-state relay is closed.

Specifications subject to change without notice.

WARRANTY

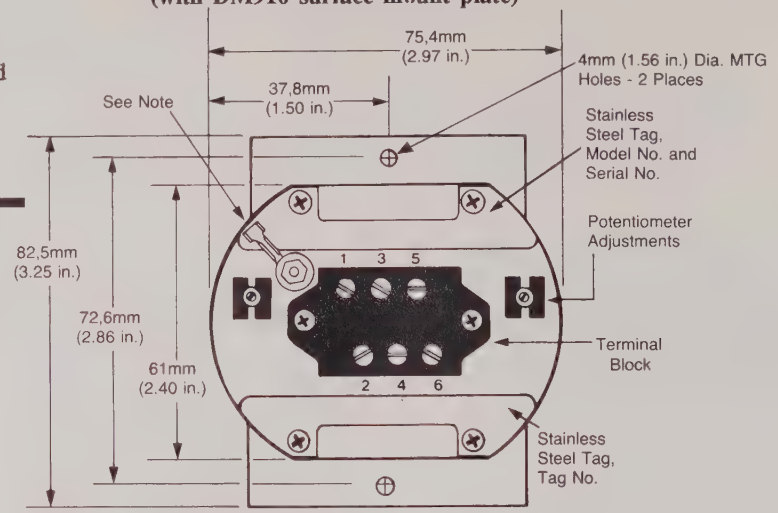
All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

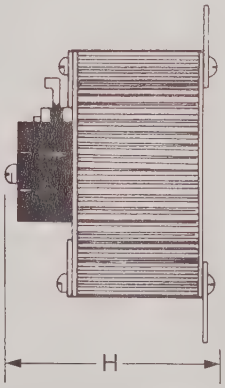
DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)



*NOTE: Crimp-lug for ground (earth).



H = 1.95"(50mm)

Terminal Block Designations

Model DT-678

1	+IN	**4**	RS
2	-IN	**5**	+REL
3	RS	**6**	-REL

Abbreviations:

IN = Signal input
RS = Reset
REL = Solid-state relay

DORIC

Represented by:

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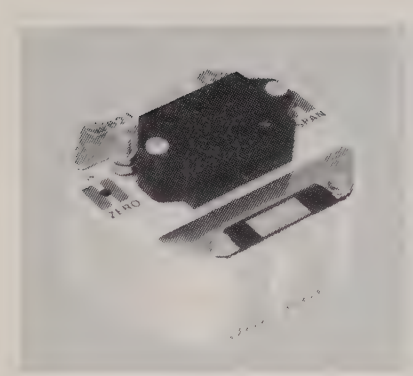
Pressure-to-Current Transmitter

DT-690



The DT-690 may be installed in a control room. Or, they can be mounted in the field in a variety of optional enclosures, including water-tight and explosion-proof cases.

CALIBRATION

If calibration is required, set the input to minimum and adjust **Zero** for minimum output. Set the input at maximum and adjust **Span** for maximum output. Repeat as required.

FEATURES

All Solid-State:
No moving parts to wear and adjust.

Infinite Resolution Sensor:
Temperature compensated.

Minimum Contained Volume:
No air or pressure consumation. Loop powered.

OPERATION

The Doric Model DT-690 is a pressure-to-current transmitter. The DT-690 two-wire version can be connected in series with a 12-42Vdc power source and a resistive load.

The DT-690 accepts a standard 3-15 psig pneumatic input. The output is a standard 4-20mA analog process signal.

Reliable and highly accurate, the DT-690 may be interfaced with display or recording hardware to monitor a single loop or an entire pneumatic plant. Because there is no internally generated ripple in the output, the DT-690 can input directly into a computer.

All solid-state, the DT-690 features an advanced resistive pressure transducer and extremely precise monolithic temperature compensating circuitry.

Model DT-690 consumes no air or supply pressure. This feature, along with a minimum contained volume allow the DT-690 to be installed without pneumatic loop upset. The all solid-state DT-690 contains no bellows or capsule and is therefore virtually impervious to shock or vibration.

SPECIFICATIONS

OPERATING TEMPERATURE
-18 to 72 °C. (0 to 160 °F).

OUTPUT
4-20mA (limited to 30mA maximum).
10-50mA (limited to 65mA maximum).

LINE VOLTAGE CHANGE EFFECT
±0.015% of span per Vdc change.

POWER
12Vdc (minimum).
42Vdc (maximum).
All voltages measured at output terminals.

LOAD CAPABILITY

$$R_{load} = \frac{E - 12}{I}$$

Where:
E = 12 to 42V
I = 4 to 20mA (10-50mA)
R_{load} = Loop resistance.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 2% of span.

ZERO AND SPAN ADJUSTMENT
±10% of span.

STABILITY
Less than 0.018% of span per °C.

RESPONSE TIME
Less than 200 milliseconds.

REPEATABILITY
Less than 0.1% of span.

LINEARITY
Less than 0.1% of span.

INPUT (Instrument Air Only)
3-15 PSI
3-27 PSI

PRESSURE LIMIT
45 PSI maximum without recalibration.
60 PSI maximum without damage.

INPUT CONNECTION
1/4" NPT Female.

Specifications subject to change without notice.

WARRANTY

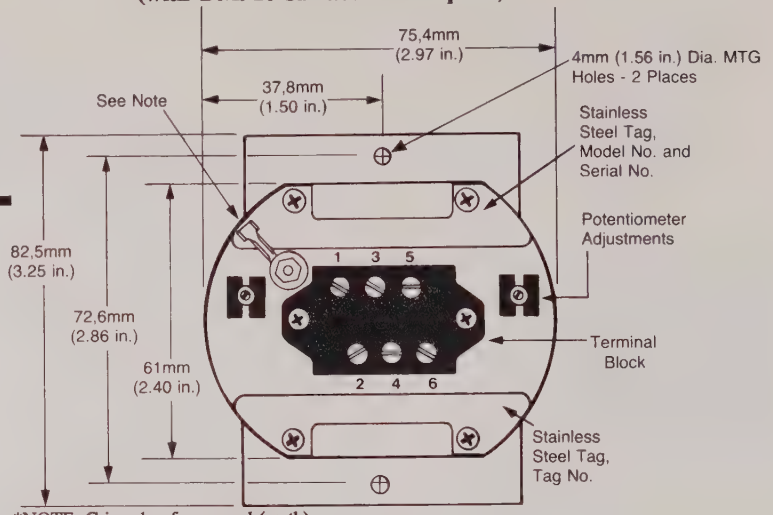
All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

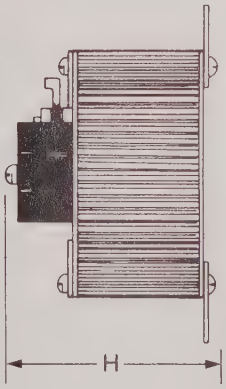
DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)



*NOTE: Crimp-lug for ground (earth).



H = 1.68"(42.7mm)

Terminal Block Designations

Model DT-690

1	+I	4	
2		5	
3	-I	6	

Abbreviations:

I = Power supply and current output

DORIC

Represented by:

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Emerson Electric Company
3883 Ruffin Road
San Diego, CA 92123-1898

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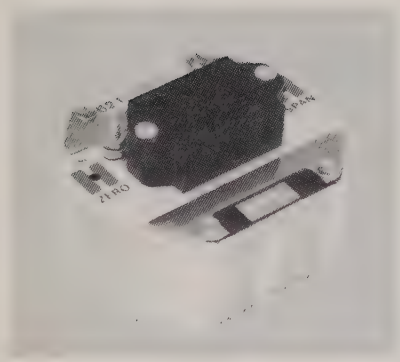
DORIC DATA

Two-Wire Wide Ranging Thermocouple Transmitter

DT-723



CALIBRATION

Range Selection:
See DT-723 field calibration sheet.

Fine Calibration:
Set input to minimum, then adjust the **Zero** pot for minimum output. Set input to maximum, then adjust **Span** pot for maximum output. Repeat as required.

FEATURES

Complete Isolation:
500Vdc or AC peak.

Direct Thermocouple Input:
All standard T/C types.

Field Selectable Parameters:
Input/Output and T/C types.

High Density Installation:
Hockey puck aluminum housing.

Extremely High Common Mode Rejection:
130dB @ 60Hz.

OPERATION

The high performance DT-723 two-wire transmitter accepts millivolt input from any standard ISA thermocouple as well as low level (millivolt) input. Output is a 4-20mA or 10-50mA current signal, which is linear to the millivolt input. Both input and output range and thermocouple type can be changed in the field using solderless jumpers.

The low output ripple and high common mode rejection makes the DT-723 ideal for input to a process computer. Typical application, however, is to interface a thermocouple with recording, monitoring or controlling instruments.

The advanced circuitry of the DT-723 minimizes the problems associated with temperature measurement via thermocouple: 1) A solid-state temperature transducer for cold-junction temperature compensation. The temperature transducer and thermocouple cold-junction are packaged together in a solid brass isothermal block; 2) Complete isolation prevents ground loops; 3) Extremely high common mode rejection minimizes noise that would cause errors.

SPECIFICATIONS

OPERATING TEMPERATURE
-29 to 82 °C (-20 to 180 °F)

OUTPUT
4-20mA (limited to 30mA maximum).
10-50mA (limited to 65mA maximum).

LINE VOLTAGE CHANGE EFFECT
±0.002% of span per Vdc change.

POWER
12Vdc (minimum).
42Vdc (maximum, limit imposed by CSA).
Overvoltage 70Vdc maximum without damage.
All voltages measured at output terminals.

OUTPUT RIPPLE
Less than 10mV peak to peak @ maximum load.

LOAD CAPABILITY

$$R_{load} = \frac{E-10}{I}$$

Where:
E = 10 to 42V (70V)
I = 4 to 20mA (10-50mA)
R_{load} = Loop resistance.

COMMON MODE REJECTION
Greater than 130dB @ 60Hz.

RFI EFFECT
(465 MHz, 10V per meter)
Less than 2% of span.

ZERO AND SPAN ADJSUTMENTS
Zero: -40 to 90% of span.
Span: Field selectable
5-10mV
10-20mV
20-50mV.

STABILITY
Better than 0.02% of span per °C.

RESPONSE TIME
80 milliseconds.

REPEATABILITY
0.05% of span.

LINEARITY
0.05% of span.

ISOLATION
500Vdc or AC peak.

INPUT BIAS CURRENT
10 nanoamps maximum.

COLD JUNCTION ERROR
±2.25 degrees maximum.

BURNOUT PROTECTION
Upscale or downscale.
(Field selectable)

INPUT
Field selectable. Thermocouple types J, K, T, R, S and E or millivolt.

Specifications subject to change without notice.

WARRANTY

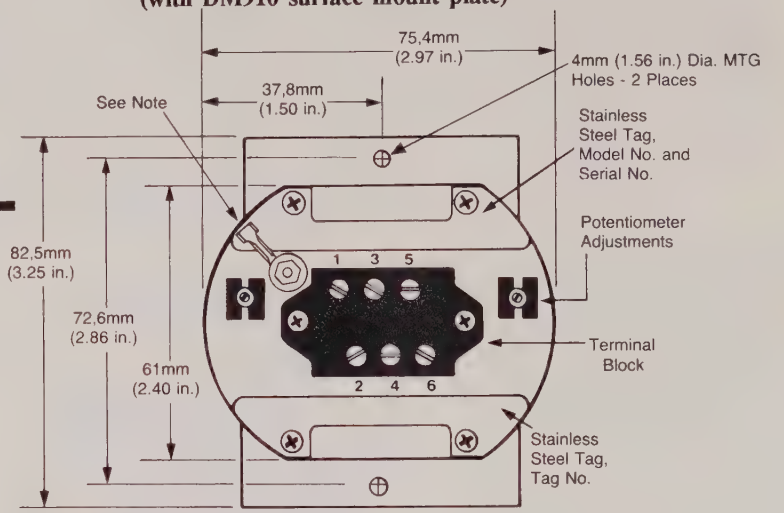
All Doric signal conditioning modules are *unconditionally warranted* to be free from defect in parts, materials, and workmanship for a period of ***three years*** commencing with the date of shipment to the original purchaser.

MOUNTING OPTIONS

DM910 - Surface mounting plate
DM902 - Snap-track mounting plate
Explosion-proof housing (see order guide)

DIMENSIONS

(with DM910 surface mount plate)



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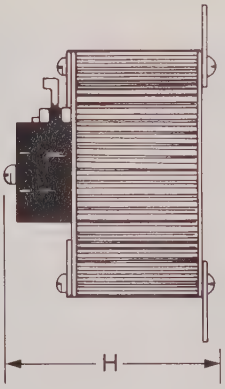

H = 2.5"(63.5mm)

Terminal Block Designations

Model DT-723

1	+PS	4	-IN
2	+IN	5	
3	-PS	6	

Abbreviations:

PS = Power supply and current output
IN = Signal input

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CATALOG REGISTRATION

Dear Representative:

Please fill out the form below and return it to Doric Scientific. Completion of this form will enable us to send you future updates on the Signal Conditioning products in this catalog.

If you have any questions, please feel free to call us at (619) 495-3255.

Thank you,

Shelly M. Vickery
Manager, Marketing Communications

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